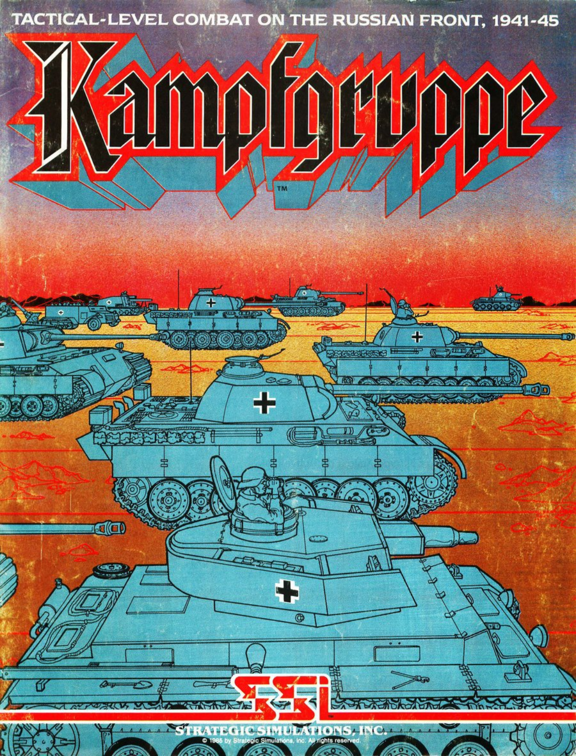

TACTICAL-LEVEL COMBAT ON THE RUSSIAN FRONT, 1941-45
Kampfgruppe
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Kampfgruppe

RUSSIAN ARMORED VEHICLE RATINGS

#	WEAPON	MR	MP	SS	AC	SP	MG	FA	BA	SL	YR
tanks											
47	T-70	5	5	2	2	14	1	5	2	2	2-8
28	BT-7	6	6	2	2	21	2	3	1	3	1
29	T-26S	6	6	2	2	12	2	3	2	2	1
30	T34/76A	8	7	4	4	21	2	11	6	3	1-4
31	T34/76C	10	8	4	6	21	2	11	6	4	2-8
32	T34/85	12	15	4	6	20	2	11	7	5	6-8
33	T-28C	6	7	4	2	12	3	5	2	5	1
34	KV-I	8	7	4	4	10	3	12	8	5	1-3
35	KV-II	8	0	6	4	8	2	11	7	6	1-2
36	KV-IC	10	8	4	6	10	3	12	8	5	3-6
37	KV-85	12	15	4	6	10	3	11	7	5	6-8
38	JS-II	15	20	5	6	12	4	19	10	5	6-8
39	JS-III	15	20	5	6	12	3	30	12	5	8
tank destroyers											
40	SU-76	10	8	4	6	14	1	5	2	3	4-7
41	SU-85	12	15	4	6	20	0	9	5	3	5-8
44	SU-100	15	19	5	6	20	0	14	5	5	7-8
45	JSU-122	15	20	5	5	12	1	18	8	5	7-8
assault guns											
42	SU-122	10	0	5	6	19	0	9	5	3	5-8
43	SU-152	12	0	6	4	10	0	12	5	5	5-7
46	JSU-152	12	0	6	4	10	1	18	8	5	7-8
carrier											
	HALFTRK	5	0	1	50	16	0	1	1	3	1-8

RUSSIAN NON-ARMORED WEAPON RATINGS

WEAPON	MR	MP	SS	AC	SP	SL	DF	YR
TRUCK	0	0	0	0	11	3	1	1-8
45AT	8	10	2	6	0	1	3	1-8
76AT	10	11	4	6	0	1	3	1-8
76H	15	0	4	6	0	1	3	1-8
50MOR	2	0	3	8	5	1	8	1-8
82MOR	16	0	4	8	4	1	7	1-8
120MOR	28	0	5	9	2	1	5	1-8
HMG	5	0	1	50	5	1	8	1-8
SMG	1	0	1	40	6	1	9	1-8
RIFLE	2	0	1	10	6	1	9	1-8
GRENADE	0	25	1	25	–	–	–	1-8
FLAMETH	0	30	4	8	–	–	–	1-8
L-ART	99	0	4	8	–	–	–	1-8
M-ART	99	0	5	8	–	–	–	1-8
H-ART	99	0	6	8	–	–	–	1-8

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GERMAN ARMORED VEHICLE RATINGS

#	WEAPON	MR	MP	SS	AC	SP	MG	FA	BA	SL	YR
tanks											
0	PZ-IIF	5	4	1	6	12	1	3	1	2	1-5
1	PZ-IIL	5	4	1	6	16	1	3	2	2	4-8
2	PZ-38T	6	5	2	6	12	2	5	2	3	1-2
3	PZ-IIIF	7	6	3	6	11	2	3	3	3	1-4
4	PZ-IIIG	7	6	3	6	12	2	4	3	3	1-4
5	PZ-IIIJ	8	10	3	8	11	2	6	3	3	2-5
6	PZ-IIIL	8	10	3	8	11	2	7	4	3	3-5
7	PZ-IVF1	8	2	4	6	12	2	5	3	4	1-3
8	PZ-IVG	12	13	4	8	12	2	7	3	4	3-5
9	PZ-IVH	12	14	4	8	12	2	8	4	4	5-8
10	PANTHER	15	18	4	8	17	2	15	5	5	5-8
11	TIGER	15	15	4	8	12	2	11	8	5	4-8
12	K. TIGER	15	22	4	10	10	2	23	9	6	7-8
tank destroyers											
13	SG-IIIB	8	2	4	6	12	0	5	3	3	1-3
14	SG-IIIG	12	14	4	8	12	1	10	4	3	3-8
15	MARDER	12	14	4	8	12	0	3	1	4	3-7
16	NASHORN	20	22	4	10	14	0	4	1	6	4-6
17	ELEFANT	15	22	4	8	6	0	23	8	6	5
18	JPZ-IV	15	18	4	8	9	0	13	3	3	6-8
19	HETZER	12	14	4	8	9	1	14	2	3	6-8
20	JPZ-V	15	22	4	10	16	1	16	5	5	7-8
21	JPZ-VIB	20	27	5	6	8	1	25	9	6	8
assault guns											
22	STU-H42	12	0	5	6	12	1	8	4	3	3-8
23	SIG33	10	0	6	6	12	0	3	1	4	4-8
self-propelled artillery											
24	WESPE	12*	0	5	6	9	1	2	1	3	3-8
25	HUMMEL	12*	0	6	6	12	1	3	1	6	4-8
armored cars											
26	SK231	5	4	1	6	22	1	2	1	3	1-8
27	SK234/2	7	10	3	8	22	1	4	1	3	6-8
carrier											
	HALFTRACK	5	0	1	50	16	0	1	1	3	1-8

GERMAN NON-ARMORED WEAPON RATINGS

WEAPON	MR	MP	SS	AC	SP	SL	DF	YR
TRUCK	0	0	0	0	11	3	1	1-8
37AT	6	6	2	6	0	1	3	1-4
50AT	8	10	3	8	0	1	3	2-5
75AT	12	14	4	8	0	1	3	3-8
88AT	20	22	4	8	0	2	3	6-8
88FLAK	20	15	4	20	0	3	3	1-8
75IG	10	0	4	6	0	1	3	1-8
150IG	10	0	6	6	0	2	3	1-8
81MOR	13	0	4	8	4	1	7	1-8
120MOR	28	0	5	9	2	1	5	1-8
HMG	5	0	1	50	5	1	8	1-8
SMG	1	0	1	40	6	1	9	1-8
RIFLE	2	0	1	10	6	1	9	1-8
GRENADE	0	25	1	25	–	–	–	1-8
FLAMETH	0	30	4	8	–	–	–	1-8
PZFAUST	0	20	3	4	–	–	–	5-8
L-ART	99	0	4	8	–	–	–	1-8
M-ART	99	0	5	8	–	–	–	1-8
H-ART	99	0	6	8	–	–	–	1-8

* The German HUMMEL and WESPE have a maximum range of 99 when using indirect fire.



1.0 INTRODUCTION

KAMPFGRUPPE is a platoon-level tactical game of combat on the Eastern Front from 1941 to 1945.

1.1 Description of Action:

Each game turn consists of two phases. In the orders phase, the players, one at a time, give orders to the units which they control. In the joint combat phase all units carry out these orders, one unit at a time. The combat phase represents two minutes of action, broken down into four 30-second pulses.

1.2 Talking to the Computer:

To enter a response to the computer that consists of numbers, type the number into the computer and press the <RETURN> key. To select a routine from a menu or answer a Yes/No question, just press the desired key. WHERE THE EXIT COMMAND IS NOT SPECIFIED, PRESS <X> TO EXIT THE MENU.

1.3 Saving a Game:

At the end of the DEPLOYMENT PHASE and at the end of each COMBAT PHASE, the computer will allow the player(s) to save the game in progress. You will need a scratch disk to store the save game data. Save game disks may be initialized for SSI use during a game by following instructions included in the game program. Each save disk will hold approximately 4-6 games. *(Warning: the program will not inform you when you have exceeded the disk space on your save game disk.)* Once a game is saved you will be able to restart it at the point you left off.

WHEN RESTARTING A SAVED GAME YOU MUST SET THE CORRECT NUMBER OF PLAYERS ON THE OPENING MENU.

1.4 The Map:

The KAMPFGRUPPE map is a 60 × 60 square grid with each square measuring 200 yards across. At the start of each game the terrain is randomized in accordance with parameters determined by the players.

1.5 Starting the Game (Apple):

To begin the game, boot side one and the game will begin automatically. If you are using an Apple II with Pascal you must first use your BASICS disk. If you are using an Apple III you must first go into Apple II emulation mode. If you elect to play a historical scenario, the computer will ask you to insert side two of the disk so that it may read in the scenario data. When this is complete the computer will instruct you to reinsert side one for the remainder of the game.

1.6 Starting the Game (Atari):

To begin the game, boot the Scenario side of your disk. Before beginning remove all cartridges from your computer. Owners of the 800XL will have to hold down the OPTION key when they turn on their computer to boot the game. After you have deployed your forces (or after you have selected to play a historical scenario), the computer will ask you to insert the Game side of your disk.

1.7 Starting the Game (Commodore):

To begin the game, insert the game disk into your disk drive. Type LOAD "*", 8 and press <RETURN>. When READY appears, type RUN and press <RETURN>.

1.8 Sound:

During the combat phase, players may toggle the sound ON/OFF by pressing the "S" key.

2.0 GENERAL DESCRIPTION

2.1 Parts Inventory:

a. Game box
b. Rule book
c. 5¼" game disk
d. Data card

2.2 Abbreviations:

Abbreviations used in the game are listed below:

BDE	brigade
DET	detachment
CO	company
BN	battalion
MOT	motorized
PZG	panzergrenadier
PZ	panzer
JPZ	jagdpanzer (tank destroyer)
STUG	sturmgeheschultz (assault gun)
INF	infantry
RIF	rifle
ART	artillery
AT	anti-tank
MOR	mortar
ENGR	engineer
IG	infantry gun
HOW	howitzer
HMG	heavy machine gun
SMG	submachine gun
VG	volksgrenadier

3.0 STARTING THE GAME

3.1 Determining Conditions of Play:

At the start of the game the player(s) must determine the conditions under which the game will be played. On the Apple® version the conditions may be changed by entering the following numbers:

(1) NEW GAME or SAVED GAME
(2) 1 DISK DRIVE or 2 DISK DRIVES
(3) SOLITAIRE or TWO PLAYERS
(4) HANDICAP LEVEL
(5) DELAY LENGTH
(6) SELECT SCENARIO

On the ATARI® and C-64™ versions:

(1) NEW GAME or SAVED GAME
(2) SOLITAIRE or TWO PLAYERS
(3) HANDICAP LEVEL
(4) DELAY LENGTH
(5) SELECT SCENARIO

3.2 Player Determination:

KAMPFGRUPPE may be played by either zero, one, or two players, and this is determined by the option selected on the menu. For example, if you wished to watch a computer controlled German force face a computer controlled Russian force, you should select the option BOTH COMPUTER.

3.3 Handicap Level:

At the start of the game the players must determine the handicap level (1-5). The effects of the handicap levels are listed below:

Level 1: German strength reduced 50%
Level 2: German strength reduced 25%
Level 3: No reduction
Level 4: Soviet strength reduced 25%
Level 5: Soviet strength reduced 50%

EXAMPLE: At level 1 the number of weapons in German platoons would be reduced by approximately 50%.

3.4 Delay Length:

The delay length affects messages displayed during the Combat Phase. The greater the delay length, the longer these messages will remain displayed during the Combat Phase. A delay length of 1 will speed up the game, but will cause the messages to be virtually unreadable. A delay length of 9 will slow the game considerably, but will allow the player maximum time to study the various reports provided during the Combat Phase. Any integer between 1 to 9 may be entered.

3.5 Selecting a Scenario:

You may select one of 4 historical scenarios (see section 9.0), or you may elect to build your own scenario. If you select a historical scenario, the computer will skip the deployment phase and go directly to turn 1. If you elect to build your own scenario you will be asked several questions (see sections 3.6–3.9). New players are advised to begin by playing scenarios they have created. Creating and playing a small meeting engagement is recommended. Do not attempt to play the historical scenarios until you are completely familiar with the game.

3.6 Building the Map:

At the start of the game the computer will generate a new map. Prior to generating the map the computer will allow the player(s) to input parameters that influence the nature of the terrain:

(1) INCLUDE RIVER Y/N
(2) COVER TERRAIN DENSITY (0-9)

If option (1) is answered "Y" then the map will include a river. Option (2) allows the players to control quantity of woods and broken terrain included on the map. A "0" would allow no woods/broken terrain on the map; a "9" would mean heavy woods/broken terrain density. Any number between 0 and 9 may be entered.

3.7 Selecting the Time Period:

The player(s) may select from eight different time periods. The time period will affect the type of forces/equipment that may be used in the battle as well as the command control capabilities of the two armies.

3.8 Selecting the Type of Battle:

The player(s) may select from five different types of battle:

(1) GERMAN PURSUIT
A small Soviet force fights a rear-guard action against a large German force.



(2) GERMAN ASSAULT
A large German force attacks a medium Soviet force. Both sides may use off-map artillery.

(3) MEETING ENGAGEMENT
Opposing forces of equal strength advance on the same objective.

(4) SOVIET ASSAULT
A large Soviet force attacks a medium German force. Both sides may use off-map artillery.

(5) SOVIET PURSUIT
A small German force fights a rear-guard action against a large Soviet force.

The player(s) must also determine the size of the battle:

(1) LARGE
(2) SMALL

In a "small" battle the quantity of units on both sides will be reduced by approximately 50%.

3.9 Selecting Forces:

The Soviet player may select either a Tank or an Infantry type force. The German player may select a Panzer, Motorized or Infantry type force. If the AUTO-SELECT routine is used then the computer will select a force to suit the type of battle.

The players have a limited number of selection points (SPs) that they may use to "buy" various types of companies or battalions. The computer will only allow the selection of formations that are appropriate for the type of force selected.

The player(s) will receive 20 victory points for each SP that is not used to buy combat formations. A maximum of 250 points may be received in this manner.

4.0 DEPLOYMENT

When creating a new scenario, the player(s) may arrange their units on the map before the game begins to optimize their attack or defense. Soviet units may not be deployed west (left) of their "start line" and German units may not be deployed east (right) of their "start line". If the AUTO-DEPLOY routine is used then the computer will automatically deploy the units on the map. AUTO-DEPLOY will not provide the *best* possible deployment; it represents a "hasty" deployment. If the AUTO-DEPLOY routine is not used, the players will find their units at the top of the map.

4.1 Combat Formations:

All units in the game are organized into combat formations (CFs). CFs consist of a headquarters (HQ) unit with from 1 to 8 attached combat units.

CFs are each assigned an identification letter (A-U). The units attached to a CF are each assigned an index number (0-9). The formation letter and the index number are combined to form the unit ID.

EXAMPLE: the 3rd unit in formation C would have C3 as its UNIT ID.

The HQ unit in all CFs will be assigned index number "0".

4.2 The Map Display:

The map display used in KAMPFGRUPPE is a 60 × 60 square grid. Only a fraction of the map (20 squares wide by 10 squares high) may be viewed at one time. By pressing the keys 1-8 the cursor can be moved around the map (1-N, 2-NE, 3-E, 4-SE, 5-S, 6-SW, 7-W, 8-NW). If the cursor is moved to the edge of the display then the map will scroll to reveal the hidden portions of the map.

When playing an assault type battle, the map is reduced to 60 × 30 (60 spaces east-west by 30 spaces north-south).

4.3 Unit Symbols:

All units on the map are identified by symbols that describe their function and nationality.

SOVIET VEHICLES are represented by vehicle silhouettes facing west.

SOVIET INFANTRY is represented by symbols of two men underlined.

SOVIET ARTILLERY is represented by an underlined weapon symbol.

SOVIET STACK is represented by two overlapping white squares.

GERMAN VEHICLES are represented by vehicle silhouettes facing east.

GERMAN INFANTRY is represented by symbols of two men (no underline).

GERMAN ARTILLERY is represented by a weapon symbol (no underline).

GERMAN STACK is represented by two hollow overlapping squares.

CONFLICT (opposing forces on same square) is represented by an SU / GE symbol.

4.4 Map Display Menu:

The map display menu lists the following routines:

- (1-8) Move cursor.
- (9) Build entrenchment (only before ASSAULT type battles).
- (0) Use auto-deploy routine.
- (A-T) Select unit. Press formation letter followed by unit index number — computer will shift to UNIT ORDERS MENU.
- (U) Change terrain in square (see appendix 3 for terrain key).
- (V) View. Inverses all squares with a line of sight to the cursor location.
- (W) Move cursor to OBJECTIVE AREA (see 4.6) then START LINE.
- (X) Exit deployment phase.
- (Y) Clear units from screen to view terrain.
- (Z) Examine friendly units at cursor location.

4.5 Unit Orders Menu:

The unit described at the top of the text window is the "current unit". The following routines may be used to adjust the starting location or inspect the status of the current unit:

- (1-8) Move cursor.
- (9) Change weapon type of armored vehicle.
- (D) Disembark unit. If unit is a vehicle then it will unload all of its passengers; if the unit is a passenger then only that unit will unload.
- (E) Embark unit. Order must be given to a vehicle unit — the computer will request the ID of the unit to be embarked.
- (L) Look for unit. The cursor will move to the unit's location.
- (M) Move unit. The unit will move to the cursor location.
- (N) Next unit. The next higher numbered unit will become the current unit.
- (P) List passengers. Will list the units embarked aboard the current unit.
- (Q) Quit the orders menu. Return to the map display menu.
- (V) View. Inverses all squares that may be seen from the cursor location.
- (X) Exit the unit orders menu. Return to the map display menu.

4.6 The Objective Area:

The objective area may be located by pressing the (W) key on the map display menu. The cursor will move to the CENTER of the objective area. The objective area is a 19 × 19 square area. In some scenarios the players will score points for each infantry man, gun or vehicle that ends the game in the objective area.

4.7 Saving the Set-Up:

At the conclusion of the deployment phase the computer will allow you to save the set-up on a disk initialized for SSI use (disks may be initialized at this time).

4.8 Entrenchments:

If the type of battle is a SOVIET ASSAULT or GERMAN ASSAULT then the players may "build" entrenchments for their units. Entrenchments are built by moving the cursor over a clear terrain square and pressing the "9" key when the computer is in MAP DISPLAY MODE. Entrenchment squares will look like and have the same effect as BROKEN terrain squares.

Players may build a maximum of 50 entrenchments. Entrenchments may only be built on the friendly side of the start line.

4.9 Off-Map Artillery:

Off-map artillery may be available only during assault type battles. Off-map artillery will be designated only as LIGHT, MEDIUM or HEAVY ARTILLERY. When selecting forces the player will receive off-map artillery by taking the German ARTILLERY DETACHMENT or the Soviet HOWITZER BATTALION, MEDIUM ARTILLERY BATTALION or LIGHT ARTILLERY BATTALION.



Off-map artillery will never be displayed on the map. Available off-map artillery may be inspected after the game has started by using the BOMBARDMENT routine.

If AUTO-SELECT is used when playing an assault type battle, both sides will receive off-map artillery.

4.10 Changing the Map:

During the deployment phase, players may use the U key to create any terrain desired on any square of the map. This allows players to create any map desired. More the cursor to the square you wish to change, type U, and then type the number of the terrain (see appendix 3 for a list of terrain types). When designing a map, keep in mind that often the computer intelligence cannot deal with river terrain.

4.11 Changing Weapon Types of Armored Vehicles:

Players wishing to create their own scenarios may change the weapons of any of the armored vehicles except halftracks. To change a unit's weapons go to the unit orders menu, type 9, and then type the number of the weapon desired for the current unit (see section 6.0 for weapon numbers).

4.12 Visibility Level:

At the beginning of the first turn of each game, the computer will randomly determine the visibility level. The visibility level will be set between 7 and 20 and will remain constant throughout the game. The visibility level is the maximum range at which units may spot and direct fire at enemy units.

5.0 ORDERS PHASE

During the orders phase the player(s) may review the status of their units and assign movement, bombardment and targeting orders.

5.1 Map Display Menu:

The map display menu used during the orders phase is similar to the one used during the deployment phase.

- (1-8) Move cursor.
- (0) End game.
- (A-U) Select unit. Press formation letter followed by unit index number — computer will shift to UNIT ORDERS MENU; the selected unit will be the "current unit".
- (V) View. The computer will inverse all squares that can be seen from the cursor location.
- (W) Move cursor to center of objective area.
- (X) Exit orders phase.
- (Y) Clear units from screen to view terrain.
- (Z) Examine friendly or visible enemy units at cursor location.

5.2 Unit Orders Menu:

Upon selecting a unit from the map menu it will be displayed beneath the map showing its composition (number and type of vehicles or weapons), ammunition (shown as A, in pulses of firing remaining), facing (shown as a compass direction), speed (in movement point rate, it is also miles per hour), and whether it's loaded (an L is displayed when loaded). The following routines may be used to assign orders to or inspect the status of the current unit:

- (1-8) Move cursor.
- (A)* Advance. This command is only used when the computer is in all-units mode; the formation HQ will move to the cursor location, other units in the formation will move in such a way as to retain their current position relative to the HQ.
- (B) Bombard. The cursor location is the target square; the current unit is the spotter; the computer will list the artillery units eligible to bombard the target (see section 5.6).
- (C) Center. The map is centered around the cursor.
- (D) Disembark. If the current unit is a vehicle then it will unload all of its passengers; if the current unit is a passenger then only that unit will unload; unloaded passengers will have a suppression level of 80.
- (E) Embark. Order must be given to a vehicle unit — the computer will request the ID of the unit to be embarked (see section 5.4).
- (F)* Change unit facing.
- (H) Find unit's HQ. Cursor moves to unit's HQ location; computer determines if a "command control" link exists between the current unit and the HQ; the HQ becomes the new current unit.
- (I) Inspect. Allows the player to inspect all enemy units that can be seen by the current unit; allows the current unit to designate a priority target and/or request a bombardment (with the current unit as the spotter). Assigning a priority target with the (I)nspect order will cause a range order to be given if the target is outside of the set maximum range, with the maximum firing range being set equal to the distance to the new target (see section 5.8).
- (K)* Cancel all orders. Allows the current unit to cancel all movement and bombardment orders.
- (L) Look for unit. Moves the cursor to the current unit's location.
- (M)* Move unit. Orders the unit to move to the cursor location (see section 5.5).
- (N) Next unit. The next higher numbered unit will become the current unit.
- (O) Check movement objectives. Moves the cursor to the movement objective location(s) of the current unit; also lists the command control delay (see section 5.5).
- (P) List passengers. Lists all units embarked aboard the current unit.
- (Q) Quit the unit orders menu. Return to the map display menu.
- (R)* Set maximum firing range at which the current unit will select targets (see section 5.7).
- (S)* Set movement speed for the current unit.
- (T) Inspect the target that the current unit has selected.
- (V) View. The computer will inverse all squares that the current unit can see with its current facing.
- (X) Exit the unit orders menu. Return to the map display menu.
- (Z) Shift to all-units mode.

5.3 All-Units Mode:

Certain orders may be given to all of the units of a particular formation. These orders are followed by an "*" in the listing in 5.2. The computer may be placed in "all-units mode" by pressing the letter "A" instead of the unit index number when selecting a unit from the map display menu. From the unit orders menu the player may shift to "all-units mode" by pressing the (Z) key.

EXAMPLE: If the current unit is C4 and the (Z) key is pressed, then the computer will shift to all-units mode for formation C. C-ALL will be shown at the top of the text window and C0 will become the new current unit.

When the computer is in all-units mode then the current unit will always be the formation HQ. The computer may not be placed in all-units mode if the formation HQ has been destroyed.

5.4 Embarking Units:

All vehicle units may embark infantry type units. Only halftrack and truck units may embark artillery type units. Each vehicle may carry a maximum of 10 transport points. Listed below are the transport costs for each type of passenger:

SMG, RIFLE	1
HMG	2
81MOR, 82MOR	3
120MOR	5
IG, HOW, FLACK, AT GUN	10

EXAMPLE: A platoon with 30 RIFLEs would require 3 vehicles to transport.

EXAMPLE: A battery of six *76AT guns* would require 6 trucks or halftracks to transport.

* This order may be given to all of the units of a particular formation.



After giving the (E)MBARK command the player must enter the ID of the unit to be embarked. If the embarking unit is in the same square as the vehicle then it will embark immediately. If the embarking unit is not in the same square as the vehicle then the vehicle will move to the square and load the unit during the COMBAT PHASE.

It is possible to instruct a vehicle to embark all of the units in a formation. Type the letter "A" instead of the index number of the passenger unit. The vehicle must be assigned to the formation it is loading in this manner. The vehicle will immediately embark the units in the same square and then move to the locations of the other units (in numerical order) and load them during the subsequent COMBAT PHASES.

If a vehicle unit receives new movement (or embark) orders, then it will cancel any previous embark orders that have not been completed.

5.5 Movement Objectives:

Movement objectives may be assigned to the current unit by moving the cursor to the desired objective location, pressing the (M) key and then entering the desired speed.

Each unit may store up to 2 movement objectives. The FIRST OBJECTIVE will always be the first objective assigned and the SECOND OBJECTIVE will always be the LAST one assigned. When a unit completes its move to the first objective location then the second objective will become the NEW first objective. If a new objective is assigned to a unit that already has two objectives, then the new objective will replace the old second objective.

Command control movement delays are imposed each time a new movement objective is assigned. Delays are not cumulative; the new delay will replace any existing delay.

Movement objectives for the current unit may be reviewed by pressing the (O) key. Movement objectives for the current unit may be cancelled by pressing the (K) key.

5.6 Requesting Artillery Bombardments:

Indirect-fire artillery bombardments may be performed by all mortars, off-map artillery, and the German Hummel and Wespe units. Any unit on the map may REQUEST a bombardment.

To request a bombardment move the cursor to the desired target square and press the (B) key. The computer will list units that are in range and capable of performing bombardments. If you wish to assign the displayed unit to the bombardment mission press the (A) key. If you wish to skip to the next unit without assigning the displayed artillery unit then press the (N) key. If you wish to exit the bombardment routine press the (Q) key.

For each artillery unit displayed during the bombardment routine, the computer will display the DELAY required before the artillery can start firing. The delay is dependent on the relationship between the requesting unit and the artillery unit:

(1) If the requesting unit is an HQ and the artillery unit is part of the same formation, then there will be a 2 pulse delay.

(2) If the requestor is a non-HQ but the artillery is part of the same formation, then there will be a 4 pulse delay.

(3) If the artillery is in the same formation as the COMMAND HQ, there will be a 6 pulse delay.

If none of the above cases apply, then there will be an 8 pulse delay. If more than one of the above cases apply, then the one with the shortest delay will be used. Off-map artillery is considered to be in the same formation as the COMMAND HQ.

When a unit is ordered to bombard, or when a mortar unit begins to fire, the unit's maximum firing range is set to zero. Do not change this until the bombardment is completed; otherwise the unit may cancel its bombardment.

5.7 Setting Target Selection Range:

Units will automatically select direct fire targets during the combat phase. The players may prevent their units from selecting targets at extreme ranges by adjusting the unit's target selection range. The target selection range may be adjusted by using the (R) routine.

EXAMPLE: A Panther tank unit has its selection range set to 5; the unit will only select targets at ranges of 5 or less even though the Panther's weapon has a maximum range of 15.

5.8 The Inspect Routine:

The (I)NSPECT routine may be used to review all enemy units that can be seen by the current unit. The cursor will move to the position of each sighted enemy unit and the player will be allowed to request a bombardment or designate the enemy unit as a PRIORITY TARGET for the current unit.

The priority target feature allows the player(s) the option of controlling the target selection of their units. If the priority target feature is not used then the units will automatically select targets during the combat phase.

5.9 Ending the Game:

The player(s) may use the (0) routine on the map display menu to end the game at any time. The computer will automatically end the game after turn 30 for assault scenarios and after turn 20 for all other scenarios. Players who wish to continue playing a game beyond its normal limits may do so.

5.10 Time:

During the combat phase, 2 minutes of actions are resolved. The combat phase is divided into 4 PULSES of 30 seconds each.

5.11 Execution Delays:

When units receive new movement or bombardment orders there will be a delay, expressed in PULSES, before the orders can be executed (see 5.5, 5.6, 5.12). Units that use the (K) cancel routine will have a 1-pulse delay added. A delay will be added to a carrier that disembarks units (1 pulse per unit disembarked).

5.12 Command Control:

Both players will start the game with a COMMAND HQ unit. For the Soviets this will be a corps unit with a "xxx" symbol ("xx" on the Atari). For the Germans this will be a regiment unit with a "III" symbol.

A unit is considered to be "in command control" if an unbroken "chain of command" exists between the unit and the COMMAND HQ. To determine command control the computer will examine each link in the chain of command.

To establish a command control link between a non-HQ unit and its formation HQ, the unit may not be more than 10 spaces from the HQ. If the unit cannot "see" the HQ, then the maximum distance is 5 spaces.

To establish a command control link between an HQ unit and its next higher HQ, the higher HQ need only exist somewhere on the map.

EXAMPLE: For an infantry platoon to be in command control it would have to establish a command control link with its company HQ, the company HQ would have to be linked with its battalion HQ and the battalion HQ would have to be linked to the command HQ.

To determine the chain of command for any unit, use the (H) routine from the unit orders menu. Continue pressing the (H) key until the cursor moves to the command HQ.

Units that receive new movement orders will be delayed a number of pulses before they start moving. The length of the delay varies with the time period, nationality, and command control status of the unit. Listed below are the movement delays for each nationality, time period and command control status (IN COMMAND CONTROL / OUT OF COMMAND CONTROL).

TIME PERIOD	GERMAN	SOVIET
1	1/5	5/9
2	1/5	5/9
3	1/5	4/8
4	1/5	4/8
5	1/5	3/7
6	1/5	3/7
7	2/6	3/7
8	2/6	3/7

6.0 WEAPONS

The weapons used in KAMPFGRUPPE are listed below. Armored vehicles are rated for gun maximum range (MR), gun maximum penetration (MP), gun shell size (SS), gun accuracy (AC), speed (SP), machine guns (MG), front armor (FA), back armor (BA), silhouette (SL), and periods of availability (YR).

RUSSIAN

#	WEAPON	MR	MP	SS	AC	SP	MG	FA	BA	SL	YR
tanks											
47	T-70	5	5	2	2	14	1	5	2	2	2-8
28	BT-7	6	6	2	2	21	2	3	1	3	1
29	T-26S	6	6	2	2	12	2	3	2	2	1
30	T34/76A	8	7	4	4	21	2	11	6	3	1-4
31	T34/76C	10	8	4	6	21	2	11	6	4	2-8
32	T34/85	12	15	4	6	20	2	11	7	5	6-8
33	T-28C	6	7	4	2	12	3	5	2	5	1
34	KV-I	8	7	4	4	10	3	12	8	5	1-3
35	KV-II	8	0	6	4	8	2	11	7	6	1-2
36	KV-IC	10	8	4	6	10	3	12	8	5	3-6
37	KV-85	12	15	4	6	10	3	11	7	5	6-8
38	JS-II	15	20	5	6	12	4	19	10	5	6-8
39	JS-III	15	20	5	6	12	3	30	12	5	8
tank destroyers											
40	SU-76	10	8	4	6	14	1	5	2	3	4-7
41	SU-85	12	15	4	6	20	0	9	5	3	5-8
44	SU-100	15	19	5	6	20	0	14	5	5	7-8
45	JSU-122	15	20	5	5	12	1	18	8	5	7-8
assault guns											
42	SU-122	10	0	5	6	19	0	9	5	3	5-8
43	SU-152	12	0	6	4	10	0	12	5	5	5-7
46	JSU-152	12	0	6	4	10	1	18	8	5	7-8
carrier											
	HALFTRK	5	0	1	50	16	0	1	1	3	1-8

* The German HUMMEL and WESPE have a maximum range of 99 when using indirect fire.

GERMAN

#	WEAPON	MR	MP	SS	AC	SP	MG	FA	BA	SL	YR
tanks											
0	PZ-IIF	5	4	1	6	12	1	3	1	2	1-5
1	PZ-IIL	5	4	1	6	16	1	3	2	2	4-8
2	PZ-38T	6	5	2	6	12	2	5	2	3	1-2
3	PZ-IIIF	7	6	3	6	11	2	3	3	3	1-4
4	PZ-IIIG	7	6	3	6	12	2	4	3	3	1-4
5	PZ-IIIJ	8	10	3	8	11	2	6	3	3	2-5
6	PZ-IIIL	8	10	3	8	11	2	7	4	3	3-5
7	PZ-IVF1	8	2	4	6	12	2	5	3	4	1-3
8	PZ-IVG	12	13	4	8	12	2	7	3	4	3-5
9	PZ-IVH	12	14	4	8	12	2	8	4	4	5-8
10	PANTHER	15	18	4	8	17	2	15	5	5	5-8
11	TIGER	15	15	4	8	12	2	11	8	5	4-8
12	K. TIGER	15	22	4	10	10	2	23	9	6	7-8
tank destroyers											
13	SG-IIIB	8	2	4	6	12	0	5	3	3	1-3
14	SG-IIIG	12	14	4	8	12	1	10	4	3	3-8
15	MARDER	12	14	4	8	12	0	3	1	4	3-7
16	NASHORN	20	22	4	10	14	0	4	1	6	4-6
17	ELEFANT	15	22	4	8	6	0	23	8	6	5
18	JPZ-IV	15	18	4	8	9	0	13	3	3	6-8
19	HETZER	12	14	4	8	9	1	14	2	3	6-8
20	JPZ-V	15	22	4	10	16	1	16	5	5	7-8
21	JPZ-VIB	20	27	5	6	8	1	25	9	6	8
assault guns											
22	STU-H42	12	0	5	6	12	1	8	4	3	3-8
23	SIG33	10	0	6	6	12	0	3	1	4	4-8
self-propelled artillery											
24	WESPE	12*	0	5	6	9	1	2	1	3	3-8
25	HUMMEL	12*	0	6	6	12	1	3	1	6	4-8
armored cars											
26	SK231	5	4	1	6	22	1	2	1	3	1-8
27	SK234/2	7	10	3	8	22	1	4	1	3	6-8
carrier											
	HALFTRACK	5	0	1	50	16	0	1	1	3	1-8

Non-armored weapons are rated for MR, MP, SS, AC, SP, SL, defense (DF) and YR.

RUSSIAN

WEAPON	MR	MP	SS	AC	SP	SL	DF	YR
TRUCK	0	0	0	0	11	3	1	1-8
45AT	8	10	2	6	0	1	3	1-8
76AT	10	11	4	6	0	1	3	1-8
76H	15	0	4	6	0	1	3	1-8
50MOR	2	0	3	8	5	1	8	1-8
82MOR	16	0	4	8	4	1	7	1-8
120MOR	28	0	5	9	2	1	5	1-8
HMG	5	0	1	50	5	1	8	1-8
SMG	1	0	1	40	6	1	9	1-8
RIFLE	2	0	1	10	6	1	9	1-8
GRENADE	0	25	1	25	–	–	–	1-8
FLAMETH	0	30	4	8	–	–	–	1-8
L-ART	99	0	4	8	–	–	–	1-8
M-ART	99	0	5	8	–	–	–	1-8
H-ART	99	0	6	8	–	–	–	1-8

GERMAN

WEAPON	MR	MP	SS	AC	SP	SL	DF	YR
TRUCK	0	0	0	0	11	3	1	1-8
37AT	6	6	2	6	0	1	3	1-4
50AT	8	10	3	8	0	1	3	2-5
75AT	12	14	4	8	0	1	3	3-8
88AT	20	22	4	8	0	2	3	6-8
88FLAK	20	15	4	20	0	3	3	1-8
75IG	10	0	4	6	0	1	3	1-8
150IG	10	0	6	6	0	2	3	1-8
81MOR	13	0	4	8	4	1	7	1-8
120MOR	28	0	5	9	2	1	5	1-8
HMG	5	0	1	50	5	1	8	1-8
SMG	1	0	1	40	6	1	9	1-8
RIFLE	2	0	1	10	6	1	9	1-8
GRENADE	0	25	1	25	–	–	–	1-8
FLAMETH	0	30	4	8	–	–	–	1-8
PZFAUST	0	20	3	4	–	–	–	5-8
L-ART	99	0	4	8	–	–	–	1-8
M-ART	99	0	5	8	–	–	–	1-8
H-ART	99	0	6	8	–	–	–	1-8

6.1 Special Infantry Weapons:

All infantry PLATOONS in the game are armed with one of the following Special Infantry Weapons (SIWs): GRENADE, FLAMETHrower, or PanzerFAUST. SIWs will only be used when firing at ZERO RANGE against ARMORED VEHICLES and will shoot at the back armor of the vehicle. SIWs will be fired instead of the platoons' normal RIFLE or SMG weapons. When using SIWs, the number of weapons firing is equal to NUMBER OF MEN in the platoon (except when using grenades in which case the number of weapons is equal to the number of men in the platoon divided by 10). When SIWs are used, the target unit automatically receives 50% suppression.

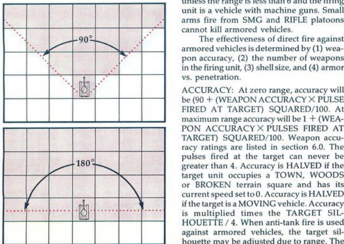
PZFAUST and FLAMETH weapons may only fire once during the game after which they will be replaced by the GRENADE as the platoon SIW.

7.0 COMBAT PHASE

The combat phase of each turn represents 2 minutes of real time. The combat phase is divided into four 30-second pulses. During each pulse units may search, select targets, fire their weapons and/or move. Before each pulse the computer selects one player's units to move and fire first during the pulse. The side with the lowest command control delay rating will be more likely to move first.

7.1 Searching:

At the start of each pulse eligible units will attempt to spot enemy units within their "field of vision". The field of vision is determined by the unit's facing and its movement status. Moving units have a 90 degree field of vision in the direction they are facing. Non-moving units have a 180 degree field of vision in the direction they are facing.



The enemy unit will be spotted if (1) it is within the searching unit's field of vision, (2) there is an unobstructed line-of-sight and (3) the enemy unit is within sighting range.

The SIGHTING RANGE equals the enemy unit's SL rating plus 1. If the enemy unit is in cover terrain then the sighting range is divided by 3. If the enemy unit is moving then the sighting range is tripled. The sighting range may never exceed the Visibility Level (set at the start of the game).

Units that previously selected a target will not search if they are still eligible to fire at that target. Units may be unable to search due to suppression.

7.2 Selecting Targets:

After searching, a unit will automatically attempt to select a target. A target must be a sighted enemy unit that is within target selection range (see 5.7). If there is more than one available target then the nearest unit will be targeted. If the searching unit has an armor-piercing weapon (MP rating greater than 0) then it will select the nearest ARMORED VEHICLE, if one is in range.

Tanks and infantry may fire on the same pulse they select a target. Assault guns, tank destroyers and artillery (mortars, anti-tank guns, infantry guns, flak, howitzers, self-propelled artillery) may not fire on the same pulse they select a target unless they are in the same square as the target.

Units will select another target if their current target is an infantry unit with a suppression level of 200 at a range greater than zero. A unit will automatically change targets in order to shoot at an enemy unit that enters its square.

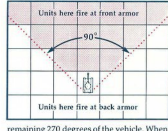
7.3 Direct Fire vs. Armored Vehicles:

Direct fire may kill or suppress armored vehicles. Armor-piercing fire against an armored vehicle will not cause suppression unless the range is less than 6 and the firing unit is a vehicle with machine guns. Small arms fire from SMG and RIFLE platoons cannot kill armored vehicles.

The effectiveness of direct fire against armored vehicles is determined by (1) weapon accuracy, (2) the number of weapons in the firing unit, (3) shell size, and (4) armor vs. penetration.

ACCURACY: At zero range, accuracy will be (90 + (WEAPON ACCURACY × PULSE FIRED AT TARGET) SQUARED/100. At maximum range accuracy will be 1 + (WEAPON ACCURACY × PULSES FIRED AT TARGET) SQUARED/100. Weapon accuracy ratings are listed in section 6.0. The pulses fired at the target can never be greater than 4. Accuracy is HALVED if the target unit occupies a TOWN, WOODS or BROKEN terrain square and has its current speed set to 0. Accuracy is HALVED if the target is a MOVING vehicle. Accuracy is multiplied times the TARGET SILHOUETTE / 4. When anti-tank fire is used against armored vehicles, the target silhouette may be adjusted due to range. The following formula is used to increase the target silhouette when the range is under 6: 6 − range. This adjustment is added to the normal silhouette of the target, but is not used when determining the accuracy of special infantry weapons.

KILLS: Armored vehicles are rated for both front and back armor. Front armor (FA) protects the front 90 degrees of the vehicle (see diagram). Back armor protects the



remaining 270 degrees of the vehicle. When firing at a range of zero, it is assumed that the fire is directed at the back armor of the target. Weapons are rated for maximum penetration (MP). MP ratings are modified by range and shell size (SS) into an ADJUSTED PENETRATION FACTOR (APF). The formula for APF is: (SS × SS) / 4 + MP − MP × (RANGE / MAX RANGE) / 2. The APF may not exceed 2 × ARMOR. If the APF is less than 1.25 × ARMOR then the ACCURACY is HALVED. If the APF is less than ARMOR then the ACCURACY is HALVED again. The number of KILLS equals (APF × ACCURACY × NUMBER OF WEAPONS FIRING) / (ARMOR × 1200).

EXAMPLE: Let's assume that 5 PZ-IIIL tanks and 10 T-34/76C are in clear terrain exchanging fire at a range of 3, with each target's front armor facing the enemy. The ACCURACY of the PZ-IIILs is:

$$= ((((5/8) \times 90) + (8 \times 1))^2) / 100$$
$$= (64.25 \times 64.25) / 100$$
$$= 41.28$$

This accuracy is adjusted by the target silhouette which is equal to 7 (T-34C has a silhouette of 4 which is adjusted to 7 due to the range of 3). So the adjusted accuracy is equal to 72.24 (41.28 × (7/4)). The APF of the PZ-IIILs is:

$$= ((3 \times 3) / 4) + 10 - ((10 \times (3/8)) /2)$$
$$= 9/4 + 10 - 15/8$$
$$= 10.375$$

Since the APF is not greater than 1.25 times the T-34C front armor of 11, the accuracy of 72.24 is cut in half to 36.12. Since the APF is not greater than the T-34C front armor of 11, the accuracy of 36.12 is cut in half to 18.06. The number of kills due to the fire of the PZ-IIILs is:

$$= (10.375 \times 18.06 \times 5) / (11 \times 1200)$$
$$= .071$$

This means that there is roughly a 7.1% chance that one T-34C will be destroyed.




If the same calculation was made for the fire of the 10 T-34Cs the result would be a kill number of .918 which would usually lead to 1 PZ-IIIL destroyed. Due to the thick armor of the T-34Cs, and the fact that they outnumber the PZ-IIILs by 2 to 1, an engagement of this type would quickly lead to a German defeat. If, however, the German player had 5 PZ-IVHs, they would fire with a kill number of .614 while the T-34Cs would return fire with a kill number of .937. This is a much better situation for the German player, although he would still need to bring up another platoon of tanks to win the engagement.

7.4 Direct Fire vs. Non-Armored Targets:
The effectiveness of direct fire against non-armored targets is determined by (1) weapon accuracy, (2) the number of weapons in the firing unit, (3) shell size, and (4) target defense strength.

ACCURACY: Calculated the same as in 7.3 with the following exceptions: (1) when firing at MOVING non-vehicle targets the accuracy is DOUBLED instead of halved; (2) accuracy is QUARTERED if the target is defending in WOODS, TOWN or BROKEN terrain irrespective of the unit's current speed setting; (3) accuracy is not affected by the target silhouette.

KILLS: Number of KILLS equals (SS × SS × ACCURACY × NUMBER OF WEAPONS FIRING) / (DEFENSE × 1000).

If the firing unit is in the same square as the target unit and the target's suppression level is greater than 99%, then the target will defend with a DEFENSE of 1, and the attacker's accuracy will be multiplied by 5.

If the firing unit is an armored vehicle and the range is less than 6 then the attacker will add its MG strength to enhance the attack. Each MG is the same as the HMG listed in 6.0.

If the firing unit is a German SMG or RIFLE unit, the effectiveness (accuracy) of the fire will be increased by 50%.

7.5 Indirect Fire:
All bombardments and all mortar fire constitute indirect fire. Indirect fire will not yield reports of kills and suppression; however, it will report when a unit has been eliminated. The effectiveness of indirect fire is determined by (1) the view of the spotter, (2) shell size, and (3) target defense strength or armor. For indirect fire, armored vehicles have ARMOR equal to BACK ARMOR + FRONT ARMOR / 3.

ACCURACY: Calculated the same as 7.3 and 7.4 except for the following: (1) the range is always considered to be the weapon's maximum range for the purpose of calculting accuracy; (2) the pulses fired at target is equal to zero if the spotter unit does not have a line of sight to the target square; (3) the pulses fired at target is equal to 1 if the spotter unit cannot see an enemy unit in the target square; (4) the pulses fired at target is equal to 4 if the spotter unit can see an enemy unit in the target square.

KILLS: Calculated the same as in 7.3 or 7.4.

Indirect fire attacks each enemy unit in the target square. If a friendly unit is present in the target square then the indirect fire mission will be canceled immediately.

If the spotter is unable to see the target square, or if there are no enemy units in the target square, then the fire will eventually "drift" into an adjacent square which will become the new target.

Bombardment fire missions will normally continue firing for 4 pulses after which the firing units will become available for reassignment.

7.6 Suppression:
Suppression will occur during most direct and indirect fire attacks. Non-armored targets may receive up to 200% suppression. Armored targets may receive a maximum of 50% suppression. If a unit is attacked more than once in a pulse then its suppression will be cumulative. Suppression will not occur if armor-piercing weapons fire at armored targets unless the firing unit is a vehicle armed with machine guns and the range is less than 6.

The level of suppression added by an attack is equal to (SS × SS × ACCURACY × ACCURACY × WEAPONS FIRING) / 200. For suppression purposes the ACCURACY will always be at least 10.

At the end of each pulse the suppression level of each unit will be halved.

7.7 Suppression Effects:
Suppression may affect a unit's ability to search, fire or move.

SEARCH: Units with greater than 99% suppression may not search. If suppression is less than 100% then there is a percentage chance, equal to the suppression level, that the unit will fail to search. Units will always search the square they occupy.

FIRE: The effectiveness of fire is reduced by ⅓ of the level of suppression (i.e. a unit with a suppression of 180% will have its fire's effectiveness reduced by 60% (180/3).

MOVE: Units with greater than 50% suppression will be pinned down and unable to move. Note that armored vehicles will never have greater than 50% suppression.

7.8 Ammunition:
All units will start the game with 40 units of ammunition. Units will expend one unit of ammunition each time they fire. Units will be unable to fire if their ammunition reaches zero.

7.9 Movement:
At the end of each pulse, eligible units with movement objectives will move. Units that fired or were pinned during the pulse will not move.

At the end of each pulse, moving units accumulate movement points equal to their current speed setting (see 6.0). Units will spend movement points to ENTER each square on their path. Listed below are the rounded off costs to enter each type of terrain for each type of unit:

	ARM-VEH	TRUCK	FOOT
clear	13	13	13
road	7	3	10
town	10	5	12
road-slope	10	5	12
broken	20	27	17
woods	20	27	17
slope	20	27	17
ford	30	40	20
bridge	7	3	10

All non-vehicle units are considered to be FOOT units. The SP rating given to each unit is very close to being equal to the unit's maximum miles per hour speed in clear terrain (when setting speed for a unit you should consider the SP rating to be equal to miles per hour).

7.10 Disembarking Under Fire:
When vehicles carrying passengers come under fire they may be forced to unload during the combat phase. Any vehicle that suffers 1 or more KILLS must immediately unload its passengers. If a vehicle other than a truck or halftrack suffers 50% suppression while carrying infantry then it must immediately unload.

If a loaded vehicle suffers KILLS then some or all of the passengers may also be killed prior to unloading.

7.11 Combat Reports:
During the combat phase the computer will describe the occurrence of direct or indirect fire. The computer will report the size and type of shell being fired and in most instances the KILL and/or SUPPRESSION results.

Listed below are the criteria for describing the size and type of shell being fired:

SMALL ARMS FIRE:	RIFLE, SMG, HMG
LIGHT ARTILLERY FIRE:	IG, HOW, MOR shell size ≤ 4
MEDIUM ARTILLERY FIRE:	IG, HOW, MOR shell size = 5
HEAVY ARTILLERY FIRE:	IG, HOW, MOR shell size = 6
LIGHT ANTI-TANK FIRE:	AT shell size ≤ 2
MEDIUM ANTI-TANK FIRE:	AT shell size = 3
HEAVY ANTI-TANK FIRE:	AT, FLAK shell size ≥ 4
OVERRUN ATTACK:	moving armored vehicles firing from zero range
FLAMETHROWER ATTACK:	FLAMETH fired from zero range
GRENADE ATTACK:	GRENADE fired from zero range
PANZERFAUST ATTACK:	PZFAUST fired from zero range

Armored vehicles with an MP rating of zero are assumed to be firing HOWitzer weapons. Armored vehicles with an MP rating greater than zero are assumed to be firing AT weapons. Halftracks are assumed to be firing HMGs.




During direct fire any KILLS or SUPPRESSION will always be displayed. During indirect fire KILLS or SUPPRESSION will not be displayed.

7.12 Sighting Firing Units:
Any unit on the map that employs direct or indirect fire has a random chance of being sighted. The chance of sighting is equal to 2 × TURNS FIRED AT SAME TARGET / RANGE TO TARGET.

7.13 Close-Combat Mode:
Armored vehicle or infantry units that are currently moving and have their engagement range set to ZERO are considered to be in CLOSE-COMBAT MODE. If a unit in close-combat mode is fired upon by a unit within 3 squares then the close-combat unit will attempt to move into the same square as the firing unit before continuing towards its planned objective.

8.0 LINE OF SIGHT

The ability of a unit to see another unit on the map is affected by the terrain that lies between them. To determine if one unit can observe another the computer will follow the proceedures listed below:

(1) Determine the straight line path from the sighting unit to the target unit. This path is the "line of sight" (LOS).

(2) Determine if the range to the target unit is greater than the visibility level, in which case the unit cannot be seen.

(3) Determine if the LOS is blocked (preventing observation) or clear (permitting observation). If any square on the LOS path contains "blocking" terrain then there is a possibility the LOS will be blocked.

(4) There are two types of blocking terrain: ELEVATED terrain and COVER terrain. Elevated terrain is any terrain on the LOS path that has a higher altitude level than both the sighting and target units. Cover terrain consists of TOWN, WOODS or BROKEN terrain squares.

(5) Elevated terrain will always block the LOS. Town terrain squares will always block a line of sight. A LOS may be traced through 1 woods square that would have otherwise blocked the LOS but will be blocked by a second woods square. A LOS may be traced through 2 broken squares that would have otherwise blocked the LOS but will be blocked by a third broken square. A LOS may not be traced through one forest and one broken square.

(6) If the LOS is not blocked and the two units are on the same altitude level, then they may observe each other.

(7) If the LOS is not blocked by ELEVATED terrain and the two units are at different altitude levels, then the following formula is used to determine if a LOS exists:

LOS is clear if $[h - (d \times H / D)]^* \geq P$

* Rounds off number to nearest integer.

H = height of higher position minus height of lower position

D = distance from higher position to lower position

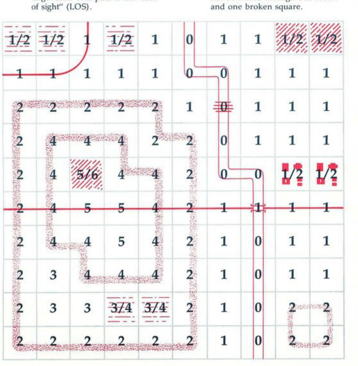
h = height of higher unit

d = distance from potential obstacle to higher position

P = height of potential obstacle

Each square on the path from the higher unit to the lower unit is a potential obstacle. Cover terrain will increase the altitude level of a square by 1 additional level when calculating the value of "P" in the above formula. The following diagram shows the heights of various terrain types on a typical map.

The computer is the final judge in determining LOS. Players may use the (V)iew key to determine which squares are visible from any particular square.



= SLOPE

= WOODS

= BROKEN

= ROAD

= RIVER

= TOWN

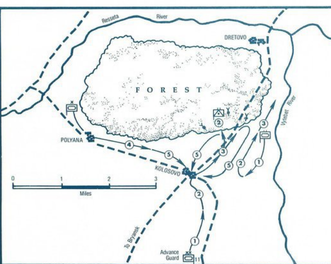
= FORD

= BRIDGE

\# = height level of terrain for purposes of blocking line of sight

\#/# = (height level of unit in square)/(height level of terrain for blocking line of sight)





9.0 HISTORICAL SCENARIOS

9.1 Meeting Engagement East of Bryansk (July 7, 1942):

This is a meeting engagement with a game length of 20 turns. The German player begins with 60 victory points, and the Soviet player begins with 0 victory points. As part of a major attack toward the Resseta River, the German 11th Panzer Division ran into a large reserve tank force which was able to inflict severe losses on the German advance guard.

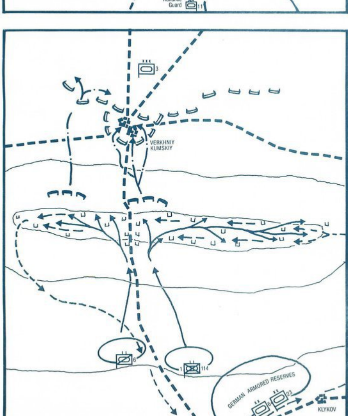
1 = German advance guard encounters Russian tank battalion

2 = Russian tanks retreat, but German attack is ambushed by AT guns in the forest

3 = German force splits in order to attack both Russian groups

4 = Russian tank brigade surprises Germans and attacks flank of German thrust

5 = Germans withdraw to Kolsovo and defeat Russians, but only after town changes hands several times





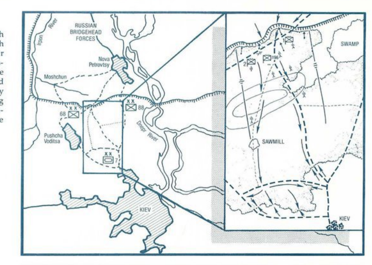
9.2 Attempted Relief of Stalingrad (December 17, 1942):

This is a German assault with a game length of 30 turns. The German player begins with 250 victory points, and the Soviet player begins with 60 victory points. The Germans are attempting to break through Russian mobile formations in order to relieve the beleaguered German 6th Army in Stalingrad. The Russians have established a strong position around the town of Verkhniy Kumskiy using motorized infantry and tanks from the Third Tank Army. Elements of the 6th and 23rd Panzer Divisions were repulsed on the 16th but eventually succeeded in taking the town on the 17th.



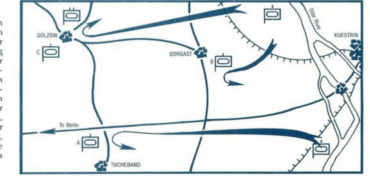
9.3 Attack Toward Kiev (November 3, 1943):

This is a Russian assault with a game length of 30 turns. The German player begins with 20 victory points, and the Soviet player begins with 250 victory points. After crossing the Dnepr River northeast of Kiev, the Russian units in the bridgehead turned south and attacked the German 68th Infantry Division. Although successful in clearing the woods of Germans, a last-minute counterattack by German armor prevented the Russians from reaching Kiev.



9.4 Attack Toward Berlin (March 22, 1945):

This is a Russian assault with a game length of 30 turns. The German player begins with 250 victory points, and the Soviet player begins with 180 victory points. After having achieved bridgeheads over the Oder River both north and south of Kuestrin, the Russians ordered a tank corps to advance down the main highway to Berlin. Facing the Russians was a newly formed Panzer division which could only scrape together 55 Panther and Tiger tanks. Fighting over flat terrain, the German tanks were able to get the better of the uncoordinated Russian armor attacks, despite being outnumbered by 2.5 to 1. The Panther tank once again proved that it was the best tank of World War II.



10.0 GAME LENGTH AND VICTORY CONDITIONS

10.1 Ending the Game:

The game will automatically end after 20 turns (30 turns if an assault battle is being played). Players may also elect to end the game early if they both agree (use the 0 key), and they may also elect to continue a game that has ended. If they elect to continue a game that has ended, the computer will never again end the game as this must be done by the players.

10.2 Victory Conditions:

At the end of the game victory points (VPs) will be awarded as follows:

EACH UNUSED SELECTION POINT 20
(maximum of 250 due to unused selection points)

FORCES IN THE OBJECTIVE AREA:
ARMORED VEHICLE 20
ARTILLERY/TRUCK 10
INFANTRY MAN 5

EACH KILL:
INFANTRY 1
HMG 2
50,81,82MOR 3
120MOR 5
OTHER ARTILLERY 10
TRUCK 10
ARMORED VEHICLE 10
plus FRONT ARMOR

Only the attacking player receives points for units in the objective area. When playing a meeting engagement type battle both players receive points for units in the objective area (both players are considered to be the attacker).

After the victory points have been totaled the defender's points will be *doubled* (points for unused selection value may be doubled to a value no greater than 500).

The computer will divide the total German victory points by the total Russian victory points to arrive at a victory ratio. Compare this ratio to the following chart to determine the victor:

2.00 and above	German Decisive Victory
1.50 – 1.99	German Substantive Victory
1.10 – 1.49	German Marginal Victory
0.92 – 1.09	Draw
0.67 – 0.91	Russian Marginal Victory
0.51 – 0.66	Russian Substantive Victory
0.50 and below	Russian Decisive Victory



11.0 WEAPON NOTES

GERMAN TANK



PZ-IIF
Used as a recon tank prior to 1944. Its 20mm gun was ineffective against all but the most lightly armored vehicles.

GERMAN TANK



PZ-IIIG
A modest improvement over the PZ-IIIF. It featured better armor and off-road mobility.

GERMAN TANK



PZ-IVG
Used as a medium and heavy support tank from late '42 to late '43. Its 75/43 gun was effective out to 1000 yards against the T34.

GERMAN TANK



PZ-IIL (Lynx)
Appeared in early 1943. Replaced the PZ-IIF. It featured improved off-road mobility.

GERMAN TANK



PZ-IIIJ
The first version of the PZ-III to be armed with the long 50/60 gun. Used as a medium tank during 1942 and '43. Limited effectiveness against the T34 at short ranges.

GERMAN TANK



PZ-IVH
Used as a medium tank from mid-'43 until the end of the war. Employed "armor skirts" for added protection and a longer 75/48 gun. More than a match for the T34/76C, and only marginally weaker than the T34/85.

GERMAN TANK



PZ-38T
Used as a stop-gap medium tank until mid-1942. Its 37mm gun was ineffective against all but the most lightly protected vehicles.

GERMAN TANK



PZ-IIIL
Used as a medium tank from late '42 to late '43. Similar to the PZ-IIIJ with additional armor protection.

GERMAN TANK



PZ-V (Panther)
Used as a medium tank from mid-'43 until the end of the war. Its 75/70 gun was effective out to 2000 yards against the T34. Widely regarded as the best tank design of the war.

GERMAN TANK



PZ-IIIF
Used as a medium tank until late 1942. Its 50/42 gun was ineffective against the T34 and KV type tanks.

GERMAN TANK



PZ-IVF1
Used as a heavy support tank before 1943. Its short 75/24 gun was ineffective against the T34 and KV type tanks.

GERMAN TANK



PZ-VIa (Tiger)
Used as a heavy tank from late '42 until the end of the war. Its 88/56 gun was effective out to 1500 yards against the T34. Outclassed all Soviet tanks during 1943. Was matched by the T34/85, KV-85 and JS-II in 1944.





GERMAN TANK





PZ-VIb (King Tiger)
Used as a heavy tank from late '44 until the end of the war. Its 88/71 gun was effective out to 2000 yards against the T-34. Extremely heavy frontal armor made it almost invulnerable to head-on fire.

GERMAN SELF-PROPELLED GUN



SK164 (Nashorn)
Used as a tank destroyer from late '42 until early '44. Its 88/71 gun with special optics could hit and kill the T34 at 4000 yards. Like the Marder it was an easy kill if Soviet tanks got close enough.

GERMAN SELF-PROPELLED GUN





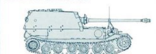
JPZ-V (Jagdpanther)
Used in non-divisional anti-tank units from mid '44 to the end of the war. Combined the protection and mobility of the Panther with the 88/71 gun used by the King Tiger.

GERMAN SELF-PROPELLED GUN



SG-IIIB
Used as an infantry support vehicle before 1943. Its short 75/24 gun was ineffective against most Soviet tanks.

GERMAN SELF-PROPELLED GUN



JPZ-VIp (Elefant)
Used as a tank destroyer during the battle of Kursk in mid '43 and then withdrawn from the Eastern Front. Armed with the 88/71 gun and protected with over 200mm of frontal armor, its effectiveness was limited by a cross-country speed of only 6 mph.

GERMAN SELF-PROPELLED GUN



JPZ-VIB (Jagdtiger)
Introduced in late '44 in non-divisional anti-tank units. With a 128/55 gun and 250mm of armor, the Jagdtiger was statistically the most impressive armored vehicle of the war. However, the 128mm gun had no real advantage over the 88/71 and a cross-country speed of 8mph limited its effectiveness.

GERMAN SELF-PROPELLED GUN



SG-IIIG
Used as a tank destroyer and infantry support vehicle from late '42 until the end of the war. Good armor, a low silhouette and the 75/48 gun made this an effective and economical anti-tank system.

GERMAN SELF-PROPELLED GUN



JPZ-IV
Used as a tank destroyer from early '44 to the end of the war. Had better armor than the SG-IIIG and the same 75/70 gun as the Panther.

GERMAN SELF-PROPELLED GUN



STU-H42
A 105mm howitzer mounted on an SG-IIIG chassis. Used from late '42 to the end of the war as an infantry support weapon. One platoon per Stug Company.

GERMAN SELF-PROPELLED GUN



SK131 (Marder)
Used as a tank destroyer from late '42 until late '44. Its 75/46 gun was effective against most Soviet tanks but its high silhouette and thin armor made it an easy kill.

GERMAN SELF-PROPELLED GUN



JPZ-38T (Hetzer)
Used as a tank destroyer and infantry support vehicle from early '44 to the end of the war. Had the same 75/48 gun as the SG-IIIG and better armor.

GERMAN SELF-PROPELLED GUN



SIG33
A lightly armored self-propelled 150mm infantry gun. Used from early '43 to the end of the war in Panzergrenadier and Motorized Regiments.




GERMAN SELF-PROPELLED GUN



PZFH-18 (Wespe)
A lightly armored self-propelled 105mm field howitzer. Used from late '42 to the end of the war as divisional artillery for panzer formations.

GERMAN ANTI-TANK WEAPON



PAK35/36 (37AT)*
Used in divisional anti-tank battalions until early '43. Ineffective against T34 and KV type tanks.

GERMAN ANTI-TANK WEAPON



FLAK18/36 (88FLAK)*
Used throughout the war in panzer division flak battalions. Until mid '42 it was the *only* weapon that could effectively stop the T34 and KV tanks. It could kill a T-34 out to 4000 yards. With a high rate of fire and optics designed to track aircraft, it crushed slow moving tanks with ruthless efficiency.

GERMAN SELF-PROPELLED GUN



PZFH-18M (Hummel)
Used from early '43 to the end of the war. Served same function as the Wespe but mounted a 150mm field howitzer.

GERMAN ANTI-TANK WEAPON



PAK38 (50AT)*
Used 1942-43 in divisional anti-tank battalions. Effective out to 400 yards against the T34.

GERMAN ANTI-TANK WEAPON



PANZERFAUST*
Used from late 1943 to the end of the war to provide infantry platoons with an effective anti-tank capability. Effective against all Soviet tanks when fired at point blank range.

GERMAN ARMORED CAR



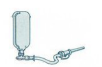
SK231
Used throughout the war in divisional recon formations. Its 20mm gun was effective only against unarmored or lightly armored targets.

GERMAN ANTI-TANK WEAPON



PAK41 (75AT)*
Used from mid '42 to the end of the war in divisional anti-tank battalions. Effective out to 1000 yards against the T34.

GERMAN ANTI-TANK WEAPON



FLAMETHROWER*
Issued to combat engineer platoons throughout the war. Effective against all tanks at point blank range.

GERMAN ARMORED CAR



SK234/2 (Puma)
Used from early '44 to the end of the war in heavy recon companies. Its long 50mm gun provided a limited anti-tank capability.

GERMAN ANTI-TANK WEAPON



PAK43/41 (88AT)*
Used from early '44 to the end of the war in panzer division anti-tank battalions. Could hit and kill most Soviet tanks within 4000 yards.

SOVIET TANK



T-70
Used in mechanized recon battalions from early '42 to the end of the war. Its 45mm gun was effective only against lightly armored vehicles.

* Not to scale.





SOVIET TANK



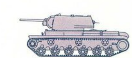
BT-7
Used as a medium tank before 1942. Its 45mm gun was occasionally effective against the PZ-38T, PZ-IIIF, PZ-IIIG and PZ-IVF1. Thin armor made this tank an easy kill for any German anti-tank weapon.

SOVIET TANK



T34/76C
Used from early '42 to the end of the war as a medium tank. Similar to the T34/76A but featured a 76/41 gun with improved range and accuracy.

SOVIET TANK



KV-Ic
Used as a heavy tank from late '42 until early '44. Similar to the KV-I but had an improved 76/41 gun.

SOVIET TANK



T-26S
Used as a medium tank before 1942. Burdened with the same weapon and poor armor as a BT-7 (with reduced mobility). This tank was phased out in flames during 1941.

SOVIET TANK



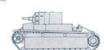
T34/85
Used as a medium tank from early '44 to the end of the war. With the appearance of the Tiger tanks in 1943 it became necessary to up-gun the T34. The 85/51 gun was effective out to 1200 yards against the Tiger.

SOVIET TANK



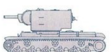
KV-85
Used as a heavy tank from early '44 to the end of the war. The KV weapon was upgraded to a 85/51 in response to the appearance of the Tiger in 1943.

SOVIET TANK



T-28C
Used as a heavy tank before 1942. Obsolete by mid '41, the T-28C had weak armor for a heavy tank. Its 76/26 gun with crude optics could punch holes in German tanks that got too close. Became extinct following the great encirclement battles of 1941.

SOVIET TANK



KV-II
Used as a heavy support tank until mid '42. Its 152mm howitzer could flatten a PZ-III while its 100mm thick armor made it invulnerable to all but the German 88FLAK.

SOVIET TANK



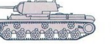
JS-II
Used as a heavy tank since early '44; it was the most widely used heavy tank in the last months of the war. Its 122/43 gun could penetrate the frontal armor of the King Tiger at 800 yards.

SOVIET TANK



T34/76A
The first production version of the T34, used as a medium tank from mid '41 until early '43. Its outstanding mobility, armor and firepower outclassed all German tanks during the first year of the war. Its 76/30 gun was effective out to 800 yards against the early war PZ-IIIs and PZ-IVs.

SOVIET TANK



KV-I
Used as a heavy tank until late '42. Armed with the same 76/30 gun as the T34/76A and protected by 20% more armor. Outclassed all German tanks during the first year of the war.

SOVIET TANK



JS-III
The final version of the JS tank to appear in World War II. First appearing in early 1945, it did not reach the front-line units in time to see much combat. Mounting the same 122/43 gun as the JS-II, its armor was redesigned to maximize the effects of sloping.

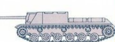


SOVIET SELF-PROPELLED GUN



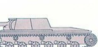
SU-76
Used as a tank destroyer from early '43 to late '44. Its 76/41 gun was not effective against Tiger and Panther tanks. Light armor made it vulnerable to all German anti-tank fire.

SOVIET SELF-PROPELLED GUN



JSU-122
Appeared in late '44 as the tank destroyer version of the JS-II. Its heavy armor and 122/43 gun were intended to counter the German "super heavy" tanks.

SOVIET SELF-PROPELLED GUN



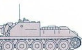
SU-152
Used as an assault gun from mid '43 to late '44. Armed with a 152 howitzer, mounted on a KV chassis.

SOVIET SELF-PROPELLED GUN



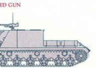
SU-85
Used as a tank destroyer and infantry support weapon from mid '43 to the end of the war. Combined excellent firepower, mobility and protection. It was the first Soviet vehicle to be armed with the 85/51 gun.

SOVIET SELF-PROPELLED GUN



SU-122
Used as an assault gun from late '43 to the end of the war. Armed with a 122mm howitzer mounted on an SU-85 chassis.

SOVIET SELF-PROPELLED GUN



JSU-152
Replaced the SU-152 in late '44. Armed with the same 152 howitzer, mounted on a JS tank chassis.

SOVIET SELF-PROPELLED GUN



SU-100
Appeared in late '44 as an up-gunned version of the SU-85. Its 100/55 gun was effective out to 1500 yards against the Panther.

SOVIET ANTI-TANK WEAPON

(Historical reference not available)

45mm L60 (45AT)
Used throughout the war in mechanized, motorized and rifle regiments. Was ineffective against the Tiger and Panther tanks.

SOVIET ANTI-TANK WEAPON



76.2mm L54 (76AT)*
Used in divisional anti-tank regiments. Experienced only limited success against the Tiger and Panther tanks.

* Not to scale.



12.0 STRATEGY NOTES

Deployment
When deploying on defense you should entrench your infantry near the forward edge of the objective area in company size positions. Position your anti-tank guns and some of your armored vehicles behind this line by 3-5 squares. Place your mortars and main HQ 5-15 squares behind the infantry on hilltops which have clear fields of vision of probable enemy approach routes. You are attempting to create a situation in which enemy tanks first encounter your infantry positions, and then almost simultaneously receive medium range anti-tank fire. Try to keep at least one company of tanks in reserve, committing them only once the axis of the main enemy attack is determined. When attacking place your infantry in half-tracks or on tanks and then set up in a tight formation no more than 5-10 squares wide. Consider splitting off a task force of one tank company and one infantry company to flank the enemy defensive positions.

Command Control
Be sure to protect your main HQ by placing it in the rear, but keep it on a hilltop if possible so that it can call in off-board artillery with a minimum delay. Keep your HQ units 1-2 squares behind the units they are commanding. Russian tank brigade and infantry battalion HQ's and all German battalion HQ's should only be committed to combat when absolutely necessary.

Getting Your Units To Move
A unit will not move as long as it is firing at an enemy unit. In order to get the unit to stop firing you must lower the unit's target selection range. Stop! It is essential that you understand this concept, as your setting it too high may keep the unit from moving as it fires ineffectively at distant targets, but setting it too low may cause the unit to continue moving into an ambush even as enemy units may appear dangerously close.

Firing on the Move
While moving, a unit may begin to fire on an enemy target. If you wish to keep firing at the enemy while taking advantage of cover terrain in the unit's square, but you also want to keep the unit's current movement objective, set the unit's speed to 0. Even if you don't want to keep the current movement objective, it is better to set the speed to 0 than to use the (K)cancel command, since the cancel command will eliminate any pulses fired at target that may already have accumulated.

Trucks
Never drive loaded trucks within range of enemy fire, as this is the quickest way to lose your guns and infantry. Keep them in cover terrain or behind hills where they cannot be spotted by enemy artillery observers.

Weapons
At least 50% of the strategy in Kampfgruppe is derived from the differences between weapons systems. It is essential that you study your weapons when beginning a scenario, as well as attempt to predict which weapons you will face. Try to establish at what range you will attempt to engage enemy tanks. For example if you have PZ-IIIJ tanks and expect to face T-34/76A tanks, it would be foolish to close to 400 yards, stop and exchange fire. The sound strategy would be to obtain back armor shots, or close to 0 range. However, if you have some 75 or 88 AT guns, it might be wise to lure the Russian tanks towards your tanks and then open up with the AT guns at medium range as you charge forward with your tanks. The key is understanding under what conditions your weapons have an acceptable chance of defeating the enemy.

Special Infantry Weapons
Infantry defending in cover terrain cannot be seen until either an enemy unit enters its square or the infantry unit opens fire. For this reason it is often wise to set the target selection range of defending infantry to zero. This will allow the infantry to ambush enemy units that enter its square. The weakness of this strategy is that each defending square, once discovered, can be attacked piecemeal. When attacking against the 0 range strategy, it is best to send infantry one square ahead of the attacking tanks, as it is much better to have your infantry ambushed than your tanks. If you don't have time for a slow infantry advance, be sure to put infantry on your tanks, for if your tanks are ambushed, at least your infantry will dismount and fire back in defense of the tanks. Do not allow infantry with grenades to continue firing at your armored vehicles, for with an accuracy of 25, their ability to hit will triple. This represents the ability of unsuppressed infantry to eventually climb on enemy tanks and destroy them with light weapons. Grenades represent infantry close assaulting tanks, in which case the thickness of the armor of the defending tank becomes insignificant; thus grenades have been given a penetration value of 25.

Suppression
In Kampfgruppe, once a unit has been fully suppressed (100+), it may easily be destroyed by a unit entering its square. The key is to identify soft-targets, keep them suppressed, and then send in at least one unit to close assault the defender. Using small arms and artillery fire to suppress armored vehicles can also be useful, as it can help keep the vehicles from acquiring new targets.

The Combined Arms Concept
Kampfgruppe rewards those who are able to use combined arms tactics. On the attack, artillery should be used to suppress and destroy enemy anti-tank guns, as well as suppress enemy mortar positions. Infantry is needed to suppress and then assault defending infantry positions, as well as help in suppressing enemy vehicles. Tanks can be used to destroy enemy vehicles and overrun suppressed enemy infantry and gun positions. Armored cars and light tanks should be positioned several squares ahead of the assault elements in order to spot enemy positions and draw fire from anti-armor weapons, thus exposing them to the fire of your artillery. On defense, use infantry to ambush tanks and suppress any units that come too close. Artillery can be used to keep attacking infantry pinned down, while anti-tank guns attack vehicles that are mixing it up with the defending infantry. Tanks should be used as a mobile reserve, fighting off major armored thrusts, or counterattacking unsupported infantry attacks.

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APPENDIX 1: KILL PROBABILITIES

FIRING TANK (Soviet)	TARGET TANK PZ-IIIJ			PZ-IVH			PANTHER		
	400	1000	1600	400	1000	1600	400	1000	1600
T-34/76A	17.2	3.0	0.2	14.7	1.4	0.1	2.2	0.5	0.1
T-34/76C	25.1	6.6	1.6	21.5	6.2	0.8	3.2	1.0	0.3
T-34/85	28.6	9.8	3.6	32.7	12.1	4.3	10.9	3.9	0.7

FIRING TANK (German)	TARGET TANK T-34/76A			T-34/76C			T-34/85		
	400	1000	1600	400	1000	1600	400	1000	1600
PZ-IIIJ	7.2	0.7	0.1	8.3	0.9	0.1	9.3	1.1	0.2
PZ-IVH	25.6	8.2	1.5	29.2	10.2	1.9	32.9	12.2	2.4
PANTHER	33.4	12.2	5.4	38.1	15.2	7.1	42.9	18.3	8.9

Hit probability of one tank firing after having previously fired for at least 3 turns. Target front armor is being fired at, target in clear terrain and not moving. Hit probabilities at 400, 1000, 1600 yards (i.e., a T-34/76A has a 17.2% chance of killing a PZ-IIIJ at 400 yards range).

APPENDIX 2: PROGRAM TO DETERMINE KILL PROBABILITIES FOR DIRECT FIRE VS. ARMORED VEHICLES

We invite you to use the program shown below to calculate kill probabilities against armored vehicles. (**Atari users:** For lines 4-18, replace **INPUT "X?" ; Y** with **PRINT "X" ; : INPUT Y.**)

Program	Description
4 INPUT "RANGE TO TARGET?" ; A	Input range to target.
6 INPUT "MR?" ; B	Input maximum range of gun.
8 INPUT "MP?" ; C	Input maximum penetration of gun.
10 INPUT "SS?" ; D	Input shell size of gun.
12 INPUT "AC?" ; E	Input accuracy of gun.
14 INPUT "TARGET ARMOR?" ; F	Input front or back armor of target.
16 INPUT "SL?" ; G : SL = G + 6 − A: IF A > 5 OR B = 0 THEN SL = G	Input silhouette of target. Calculate increase in silhouette due to range of less than 6. Do not adjust silhouette if firing weapon is a SIW.
18 INPUT "PULSES FIRED AT TARGET?" ; H	Input pulses fired at target.
20 IF H > 4 THEN H = 4	Pulses fired at target cannot exceed 4.
22 INPUT "NUMBER OF WEAPONS FIRING?" ; N	Input number of weapons firing.
24 IF B = 0 THEN B = 1	Set B to avoid DIVIDE BY 0 error.
26 AC = (((B − A) * 90 / B) + (H * E))^2 / 100	Calculate accuracy (**C-64 users:** Use ↑ key instead of (^)).
28 AC = AC * SL / 4	Adjust accuracy for silhouette size.
30 PE = ((D * D) / 4) + C − (C * (A / B) / 2)	Calculate adjusted penetration factor.
32 IF PE < F THEN AC = AC / 2	Adjust accuracy if penetration is less than armor.
34 IF PE < F * 1.25 THEN AC = AC / 2	Adjust accuracy if penetration is less than (1.25 * ARMOR).
36 IF PE > 2 * F THEN PE = 2 * F	Adjusted penetration cannot be greater than (2 * ARMOR).
38 KI = (AC * PE * N) / (1200 * F)	Calculate expected number of kills.
40 KI = INT (1000 * (KI + .0005)) : KI = KI / 1000	Round off expected number of kills.
42 PRINT "EXPECTED NUMBER OF KILLS EQUALS "; KI	Print expected number of kills.

— Divide the expected number of kills by 2 if the target is moving.
— Divide the expected number of kills by 2 if the target is in cover terrain and has a current speed of 0.

If the program above was executed, the result would look like the following example:

RANGE TO TARGET? 2
MR? 10
MP? 8
SS? 4
AC? 6
TARGET ARMOR? 8
SL? 4
PULSES FIRED AT TARGET? 4
NUMBER OF WEAPONS FIRING? 10
EXPECTED NUMBER OF KILLS EQUALS 2.15

In this example, a company of ten T-34/76C tanks is firing at an enemy PZ-IVH group. The range is 2 (400 yards), and the shots are fired at the front armor of the PZ-IVH's. The expected result is that 2.15 PZ-IVH tanks will be destroyed.




APPENDIX 3: TERRAIN SYMBOLS

0 Clear (Level 1)
1 Road (Level 1)
2 Road (Level 1)
3 Road (Level 1)
4 Road (Level 1)
5 Road (Level 1)
6 Road (Level 1)
7 Road (Level 1)
8 Town (Level 1/2)
9 Woods (Level 1/2)
10 Broken (Level 1/2)
11 Slope (Level 2)
12 Slope (Level 2)
13 Slope (Level 2)
14 Slope (Level 2)
15 Slope (Level 2)
16 Slope (Level 2)
17 Road/Slope (Level 2)
18 Road/Slope (Level 2)
19 River (Level 0)
20 River (Level 0)
21 River (Level 0)
22 River (Level 0)
23 River (Level 0)
24 River (Level 0)
25 Bridge (Level 1)
26 Bridge (Level 1)
27 Ford (Level 0)
28 Ford (Level 0)
29 Clear (Level 3)
30 Road (Level 3)
31 Road (Level 3)
32 Road (Level 3)
33 Road (Level 3)
34 Road (Level 3)
35 Road (Level 3)
36 Road (Level 3)
37 Town (Level 3/4)
38 Woods (Level 3/4)
39 Broken (Level 3/4)
40 Slope (Level 4)
41 Slope (Level 4)
42 Slope (Level 4)
43 Slope (Level 4)
44 Slope (Level 4)
45 Slope (Level 4)
46 Road/Slope (Level 4)
47 Road/Slope (Level 4)
48 Clear (Level 5)
49 Road (Level 5)
50 Road (Level 5)
51 Road (Level 5)
52 Road (Level 5)
53 Road (Level 5)
54 Road (Level 5)
55 Road (Level 5)
56 Town (Level 5/6)
57 Woods (Level 5/6)
58 Broken (Level 5/6)



APPENDIX 4:
IVAN AND THE VALKYRIES

by Robert S. Billings

Ivan lay pressed against the fresh snow covering the flat, frozen tundra. He felt rather than saw the other bodies packed closely around him. His whole world was as dark as his purpose for being there. He was only a simple peasant, though they had different words for it now. But he had been plucked up in the nightmare summer of '41 and tossed about like a wood chip on a vast, stormy sea. Now he was here, lying quietly with the others, and soon he would be walking forward into the machine guns.

A flare flickered to sudden brightness above him. He looked up briefly — then jerked his head down as the staccato of the machine thrust angry bullets over his head. Another machine gun joined in. He heard a sickening thud, followed by a suppressed groan. Then the flare flickered twice and went out. The machine guns stopped. He relaxed slightly. They hadn't seen anything. They were just shooting blindly into the vast white emptiness, easing their night terrors. Ivan knew the feeling. Hadn't he spent many long night hours lying behind a machine gun, seeing sudden dangers flicker in every shadow?

Five hundred yards away Hauptmann Kraus crouched in a shallow hole, peering intently over the edge. His eyes felt puffed and grainy from lack of sleep. He knew his company held too long a front. But so did every other company. The whole corps was out here hanging on a line with their flanks flapping in the wind. So what else was new?

So that was why he was out here in the darkest hour before dawn. If the Russkies were ready to try it again, he had to have every man on the line. But if they weren't, he had to let the men get what rest and warmth they could. At twenty below, you try to keep every man awake and on the line all the time and pretty soon you don't have a company. You have a laundry list of frostbite, trenchfoot, gangrene, pneumonia...

So it was up to the company commander to take up the slack, drag himself out here and discover or guess if they were ready to come yet. There was no way to be sure. Give them a little fold in the ground and those Russkies would hide a corps under your nose, so close they'd make you sneeze from tickling the hairs in your nostrils. It was just a judgment call — and he was tired of making judgments.

But that was what he was an officer for. Only sometimes in the darkest hour before dawn, with the temperature way below zero and his feet numb in his boots, the cynical voice would speak within him. Let the Fuhrer come up here and make this god-damned judgment call for a change. Then I'll go back to Berlin and decide whether we ought to invade China or Tibet next. Just in case we run out of Russkies sometime in the next twenty years.

He pulled his thoughts back from their treasonous path and peered intently over the edge of the hole, trying to determine whether those dark splotches in the snow could be Russkies moving up for an attack.

Two miles to the west of Hauptmann Kraus's shallow hole, Staff Officer Helmut Steiner examined the situation map spread out on the crude table under the electric lantern. The regimental command post had seen more glamorous settings — French chateaux, Ukrainian estates. Now they had been glad to get this crude peasant's hut that smelled of sweat and animals. The stone walls were thick and the space small enough to hold in some heat from the fire. Right now Helmut Steiner was not thinking of past glories. His attention was riveted on the thin, scattered lines on the situation map.

"What do we do if they come this morning?" he muttered.

"Maybe they won't," the other officer in the room said. "And if they hold off a few more days, we should have the Tigers they keep telling us they've sent."

Staff Officer Steiner snorted contemptuously. "Tigers, hell. With our luck we'd get the Porsches — no machine guns and clumsy as a pregnant tabby cat. How come we never get any Panthers?"

"Panthers!" the other officer expostulated in mock surprise. The lines and sagging skin of his face hinted at a former fullness, and his worn gray uniform hung loosely from drooping shoulders. "What do you think you're in — Das Reich? Your division only has a number, boy. You've got to be in a division with a name if you want frosting on your applestrudel."

"If we just had a battalion of Panthers," Steiner said, ignoring his fellow officer's bantering, "we could wipe out any penetration before it could start tearing things loose. Have you seen the Panther yet? It's the finest tank in the world. Thick armor, a gun that'll stop any T-34, and it maneuvers like a ballet dancer."

"Don't start singing Wagner about it," his fellow officer said drily. "They're only making about two a month. I got it straight from the woman who cleans out the Fuhrer's rest room back in Berlin. Keep 'em rare — like diamonds. Two a month. Only for name divisions. The Fuhrer's going to autograph each one personally.

Staff Officer Steiner smiled in spite of himself. He knew his friend had been highly regarded in the campaign in France, and he had two medals of valor in the '41 campaign. But for many months now he had been taking a sour view, and he had recently been moved down the promotion list at least twice. "You better watch that kind of talk. It gets around. In Berlin they'd call it defeatism. And since the bombing stepped up they take a pretty dim view of it, believe me."

His friend sighed wearily. "In Berlin they've got pretty dim view-finders. They can't see past the eastern suburbs. This god-forsaken country doesn't even exist for them. They think the war's being fought on some god-damned opera stage, with big-breasted sopranos floating around overhead and swooping down every now and then to scoop up heroes. Out here's another world. You got to keep a little sense of humor, or the marbles rattling around in your head'll start spilling out your ears."

"You and I may know that," Steiner said more gently. "But some pip-squeak replacement officer may hear you sometime and think it's his duty to report you. It's not just you and me here."

"Yes it is," his friend countered. "Only you and me in an icy hell-hole full of Russkies. And we're just off-key baritones in the back row of the chorus. And the Valkyries aren't swooping down for the likes of us."

Staff Officer Steiner ignored his friend's reply and went on studying the map. He wished he knew what was going on up there where the lines stretched pitifully thin across the front. Then he heard the rumble of artillery to the east.



Obergefreiter Weismann dove for his hole at the first sound of the incoming artillery. Cursing the enemy for interrupting him at such a time, he lay there on his belly, hurriedly pulling up his pants. Damn those Russkies. It was like they'd timed it just for him. Now they'd be in for an hour or more of steady shelling. Then the waves of infantry. Probably tanks too. It was a hell of a place for a man with a loose bowel. He was glad Kraus had had the extra ammo brought up. Hauptmann Kraus was a hard-headed son-of-a-bitch. A man in his company could hardly get away with anything. But he knew his stuff, all right.

The shells now were shrieking overhead and exploding a few hundred yards to the rear. So much the better. Give those rear-echelon bastards a little thrill to write home about. But he knew the relief was only momentary. Those Russkies used artillery like a man driving a tack with a sledge hammer. No fire direction. Hell, they didn't need it. They just lined 'em up hub-to-hub, pointed 'em straight ahead, and started the spring plowing. And he knew it was just another throw of the dice whether he'd end up fertilizer for the next crop. What the hell, when your ass belongs to the Wehrmacht — shot off or froze off, one just takes a little longer.

Suddenly the earth erupted all around him, and he cowered trembling on the very bottom of his hole. Chunks of snow and frozen earth splattered over him from a near miss. Now he was in for it. They said if one came into your hole you never knew a thing. Maybe so. But how the hell would they know that? He'd sure seen a lot it had happened to, but they weren't in condition to give evidence. Another round landed a few feet to his front, so close the vibration bounced him right off the bottom of the hole.

His heart was racing wildly and he held his breath waiting for the next one. It didn't come. He waited trembling a few more moments. Had it lifted so soon? Them damn Russkies must be running short of ammo. They hadn't plowed up one-quarter as much terrain as they usually did.

He became aware of moans and cries of pain around him. He supposed he should get up on his machine gun. But shells were still coming in a short distance away on both flanks. And lying there was downright peaceful.

"Get the hell up out of there!"

Obergefreiter Weismann gazed up into the angry face of Hauptmann Kraus.

"Yessir," he said, getting up quickly and sliding his machine gun into position. "I thought since they was still shelling on both sides of us —"

"Your job isn't to think," the company commander broke in abruptly. "Your job is to obey orders. Is that clear?"

"Yessir," Obergefreiter Weizmann snapped. He full-loaded the gun and crouched behind it, his face expressionless, his eyes peering straight ahead into the dark.

"Very well," the commander said. Then after a pause he spoke a little less harshly.

"That's a trick the Russkies have," he said. "You've been with the outfit long enough, I thought you knew it. Sometimes they'll lift the artillery for just a small corridor — and then attack down it. And it looks like we're the little corridor this time. We have to be ready for it." Then Hauptmann Kraus turned abruptly and walked along the line of holes, checking each one as he went by.

Weizmann could see nothing yet through the darkness. It would start to lighten now in a few minutes. Then his heart sank as he heard, between the ca-ruumps of the shell bursts, the grinding of tank motors to his front. Christ, he thought. Now we're really in for it.

Hauptmann Kraus took a deep breath and dashed the last few yards to his dug-in C.P. The radio operator, barely seventeen and new to the Eastern Front, was staring at him wide-eyed and open-mouthed. But everything looked all right. No shell had hit the CP yet.

"Pull your jaw up and get me battalion," Kraus said. The boy snapped his mouth shut and turned to the radio. He was a good boy, the commander thought. Just young, and new to this god-awful mess. He'd be all right. And then he added to himself ruefully, if he lives long enough.

The boy was having trouble getting through. It wasn't the boy's fault. Kraus knew every company commander in the area would be trying to get through with some desperate message. And they'd all be getting sympathy, pep talks, and the same message. "The Fuhrer has not authorized any withdrawal from this position. It must be held at all costs." Hell, he wondered why he bothered to ask. Still, he was responsible for one hundred and seven men (minus however many he'd just lost in the artillery barrage, he corrected himself). And he owed it to them to give somebody up there the facts and a chance to make a sensible decision. Before he came back with that "The Fuhrer has not authorized" crap.

Suddenly, for no reason he could think of, an image from what seemed ages ago popped into his mind. He had been riding through the streets of some large city in the Ukraine. It was summer, the sun was shining in a bright blue sky, and girls were waving as he rode past. That was when there had been enough transport for his whole company to ride in trucks behind him. That had seemed a helluva different war. He'd thought then of his as the chosen generation. It really was almost like a Wagnerian opera — only happier, less stark. Why, the people they were conquering seemed to welcome them, to love them for what they were doing. And it all made perfect sense to him then. Weren't the Germans liberating them from Stalin and the drab life he had forced on them?

We liberated them all right, he thought grimly. Kraus had seen some of the trains hauling them off like cattle to work in the factories for the German war machine. And now to drive without a large military escort through one of those cities was worth a German officer's life. The partisans would get him — or some free-booter with a salvaged rifle and a heartful of revenge. The "liberated" were now the inferior, subject races of the East. That had been a great day in the Ukrainian city. But it had been all downhill ever since. Then the radio's crackle roused him from his reverie.

Ivan lay still, hearing the roar of tank motors approaching from the rear. He looked back for the first sight of them against the gray dawn sky. He knew there was supposed to be an avenue for them to pass through the infantry lying packed together on the snow. But he knew from past experience what it was like in those T-34s. He had made friends with a tank commander before a previous battle, and he knew just how little the driver could see of where he was going. He had been allowed to ride in one, while his friend the tank commander told him what it was like going into battle in a T-34.

It was the best tank in any army. With its long seventy-six millimeter gun and heavy, sloping armor, it was more than a match for the German Mark III's small fifty millimeter. But it was a battle tank, with nothing wasted on the comfort of the men it would take into battle. The tank commander had shown him how difficult it was to get the gun loaded, aimed, and fired in the tiny space provided. After nine shots they had to pull the floor up to get at the ammunition stored beneath. And to make matters worse, the commander and his



loader were seated so they didn't turn with the turret. The turret and gun moved, but their seats, fastened to the turret ring, remained fixed (as much as anything inside that wildly pitching chassis lurching over rough terrain could be said to be "fixed"). And it was up to both of them to stay out of the way of that killing recoil from the high-velocity gun. The tank commander told him of the loader who had forgotten to lean his shoulder far enough out of the way of the recoil on a wide-angle shot. They had heard him scream once. Then the commander had had to both load and fire in the cramped space until they found a chance to stop and get the loader out. His left shoulder and part of his chest seemed to be missing, and he had bled to death long before then. Ivan knew those tankers had too much on their minds to worry about any little avenue left for them. He intended to watch out for himself. He didn't want those nineteen-inch treads, supporting over forty tons of metal, passing over him by mistake.

He saw suddenly that daylight had arrived, cold and gray. The clouds could have been a leaden tent-roof propped over them, so low did they seem.

Obergefreiter Weizmann sighted his machine gun at the tanks waddling toward him across the snow. He had too much sense to fire at them. His bullets would just bounce off, and he would have revealed his position for nothing. But there was bound to be infantry with them soon, and they were his responsibility. He would just have to hope the two anti-tank guns would do their work well. Which was probably assuming too much, considering one was only a fifty millimeter, and unless it got in a shot from the flank or rear its shells would bounce off as badly as his. But he knew the gun a hundred yards to his right rear was an eighty-eight. That could do the job, all right. But how long could one eighty-eight hold out against tanks with infantry support?

Then as he watched, the first wave of infantry rose and started forward. The tanks were just a few yards in front of them, and the two lines advanced together. Those Russkies had sure learned a lot in a couple of years. They didn't send the tanks through alone any more. All the fun was being squeezed out of this damned war.

He estimated they were about two hundred yards away now. Close enough for him to start on the infantry. But he hoped something would distract those tanks when he did. Otherwise he could end up with a seventy-six in his lap.

Machine guns were opening up now on both sides of him. He fired a long burst at the infantrymen opposite him and saw three go down. They sure hadn't learned to space themselves in an attack yet. They still came practically shoulder to shoulder. He fired another burst and saw two more go down. The machine guns were tearing huge gaps in the line of infantrymen plodding awkwardly forward. Then one of the tanks fired toward the machine gun on his right. He ducked involuntarily as pieces of shell casing whizzed past him. Other tanks were firing now, both their machine guns and the long seventy-sixes. He ducked again as a cluster of bullets zipped past over his head. Where the hell were those anti-tank guns?

There was a sharp crack to his left, followed by a clang against one of the nearest tanks. Hell, that was the fifty, and they hadn't waited long enough. He'd bet that was the last shot for that crew. He saw two of the long tank guns swinging toward the anti-tank gun's position. Then both guns spoke together. Two explosions erupted as one, and from the corner of his eye he saw part of a gun carriage fly into the air. Then there was a sharper crack from his right, and one of the tanks that had fired seemed to explode. That was the eighty-eight, all right. While he kept the bullets spraying from his own gun, he wondered if the eighty-eight would get another round off. At least a couple of turrets were cranking toward the gun's position.

Then there was a flash, followed quickly by a second. He knew that would be the Panzerfaust men. The first round hit a tank a glancing blow and ricocheted off. But the second hit just right. There was another explosion and the tank jerked to a stop. Then he was firing steadily and had no time to see anything but the awkwardly advancing figures falling to lie motionless in the snow. Yet still they came. When would they learn they were licked? Then for the first time he felt a sickening drop in his stomach as he thought — when will we?

Staff Officer Steiner listened to Hauptmann Kraus's voice on the radio without hearing any of the words he was saying. He knew them all already, and Kraus was right, and what good did it do? Steiner's superior had left him here with one simple instruction. "No retreat is authorized." He could feel the desperation in Kraus's voice, but what was the use? Yet he couldn't tell the company commander the truth — that he might as well have been talking to a phonograph.

The hauptmann's voice had stopped. Now he would have to give the same old record he'd been giving the others. "I know it's hard, but the orders are clear. Hang on somehow. That's all I can tell you."

"They've just taken out my last anti-tank gun. What do I hang on with?"

"We're expecting a trainload of Mark IV's and Tigers to arrive shortly. They'll be unloaded only ten miles from here. We've got the men to handle them standing ready. As soon as they arrive we'll rush them up. That's all I can tell you. That, and hang on."

And I shouldn't have told you that much over the radio, he thought. But how could he leave a fellow officer up there, way out on a limb, with no hope at all?

He could sense the despair and disgust in Kraus's voice as he started to sign off. Then in the midst of the transmission there was a sudden blast and scream.

"Hauptmann Kraus, are you all right?" he asked anxiously.

There was a long moment's silence, then the radio crackled again.

"I'm just peachy," the commander's voice came back. "They just killed my radio operator, is all. He just hung on a little too long, I guess."

Ivan ran a few steps and flopped down in a slight depression. That machine gun, only thirty yards away now, just wouldn't be knocked out. The tanks had already gone on past, and a second wave of infantry were well ahead on both his flanks. Most of the first wave were lying strewn about the snow, inert and lifeless, a few occasionally twitching and moaning. Around Ivan there were only motionless bodies. He didn't know why he was still alive. Perhaps it was that giant-like fellow who had fallen, a victim of the German machine gun right in front of him. Ivan had lain there for some time, apparently the only Russian infantryman still alive in that part of the field. Every now and then he had heard more bullets striking the giant-like body with a dead thud each time, like a mallet pounding a side of beef. But he knew he had to get up and go after the machine gun. After all, he was the only one left to do it. The battle was moving on. The tanks already were way ahead — except for the shattered and smoldering hulks around him. He felt a little like those hulks must feel, if they were animals instead of piles of junk. He felt a sudden kinship to them. After all, he had no business still being alive either. Every friend he'd made had gone long ago. After awhile he'd stopped making friends. It wasn't worth it. They'd almost surely be gone after one battle. Two at most. And then there would be the sorrow of their absence. Now the inert, motionless bodies around him were no sorrow to him. Let their mothers mourn them, if they had mothers and hadn't rolled off some factory production line like the smoldering tanks that loomed up around him, starkly cold and vacant against the dull gray sky.



He raised his head slightly and tried to decide how he could get ten yards closer before throwing the grenade.

Hauptmann Kraus figured he had about thirty men left — forty at most. There were those with him around the CP, who had been behind the three machine gun positions that had split the attack like a rock ledge splitting a herd of elephants charging across a plain. One of those guns, probably Weizmann's, was still firing. The other two had been silent for some time now. Almost everything else was gone. He had a feeling that the firing far to his left indicated one gun on that flank might still be working. But there was no way to get word over there, even if he had orders to pull back.

There was a narrow draw running toward the rear just a few feet from the CP. If he could get permission to withdraw, there might be a chance — an outside chance — he could get most of the little group around his CP out through that draw. It would be hard to get Weizmann out. But if that damn headquarters would ever wake up to what was happening and authorize a withdrawal, he thought there was still a chance to bring him back too.

Staff Officer Steiner felt larger and larger chunks were being chipped off his insides by a hundred little men with chisels. He had once had a vision of himself as a solid block of granite — a true German, a man of will and determination, equal to any challenge. That was when he had been a mere lieutenant commanding a small group of infantry in the '41 offensive. Where was that will and determination now? That solid block of granite had weathered and rotted into soft, porous sandstone.

The outside door opened with a bang and his friend Hans came through it, clanging it shut behind him. The loose folds of skin around his jaw, once plump with flesh, quivered slightly as he shook his head to clear it of some disastrous vision.

"Well, what did you find out?" Steiner asked quickly.

"It's all gone to hell," Hans said. He walked to the fire in the grate and stood in front of it, letting such warmth as could reach him sink into his stiffened joints and numb flesh. "The commander's disappeared. He went to get those six tanks we had being repaired. Going to 'counterattack — chop 'em off at the root,' he claimed. Only the tanks weren't ready, he never got there, and all radio contact with him's been cut. I got a look at the direction he went in. There's goddamned T-34s running all over there like cockroaches in a house on fire. Face it, boy. He's gone. Let's be charitable to the old son-of-a-bitch and say the Valkyries have come to swoop him up and carry him off to Valhalla. We will now have a one-second pause for mourning. Now, are we going to tell Kraus and the others — if there are any others left by now — to get the hell out of there?"

Steiner stood looking at his friend, incomprehension written on his face. "But I can't...you can't...he can't —"

"No time for conjugating verbs, boy. We can, you better, and they have."

"Have what?"

"Shagged ass. Now, you're it."

"I don't have any authority —"

"Yes you do, boy. Best authority in the world. In fact the only authority left, out here."

"Whose authority?"

"Rules of the game. Musical chairs. Last man left with his ass in a chair when the music stops gets to play king of the hill."

"There are three officers above —"

"Were, boy. There were three, or six, or ten, but it's no matter now. We got a fast-moving situation here. Those T-34s are blowing away chairs left and right. There's fat-assed staff officers all over the floor. The Valkyries are so loaded with heroes they're flapping their wings to near bust a gut and barely clearing the chimney-tops. You're it, boy. Now, what are you going to do?"

A sudden crackle came from the radio on the table. Then after a moment of static Company Commander Kraus's voice came through clearly.

"I've just lost my gun on the left flank. No contact with any unit except those around the CP. Tanks have gone by long ago. Infantry passing left and right of us. Can't see any good we can do here, unless you've got those tanks and are planning a counterattack. Any change in our orders?"

Steiner stared at the radio, his face white and numb.

"Oh, one thing I forgot," Hans interjected. "Those 'Tigers and Ferdinands' we've been expecting. Cross them off too. Partisans knocked out the main bridge over the river fifteen miles west of here. That railroad won't be working by a week from Tuesday."

Staff Officer Steiner stood motionless a few moments more. His ashen face seemed to be pleading with his friend for something solid to hold to. Hans looked back at him sympathetically.

"There's a time for flags and parades and speeches from Der Fuhrer. It was great fun while it lasted. But we passed that time a long time back. Der Fuhrer hasn't learned it. If he ever does. But Der Fuhrer's in Berlin, and you're in the middle of Eastern Nowhere, in snow drifts up to your ears — and you better start making your own decisions now."

Steiner's lower lip trembled slightly. He stopped it by biting down so hard blood oozed out around his teeth. He took a deep breath and strode to the situation map.

"Where do you think's the most likely place to pick up the pieces? Back here by the river?"

"It looks like the only chance to me," Hans said, all bantering gone from his voice now. "It's ten miles back, and they'll run out of steam before then. If we can get enough back and across in time —"

"Good," Steiner said, his voice firm and his jaw tight. "That's what we'll try for. You see what we can march order out of here. I'll tell Kraus and the others."

Obergefreiter Weizmann hadn't heard a friendly machine gun for some minutes. It had been quiet in front of his own position since he had sent those last few rounds at the Russkie trying to close in on him. He hoped he had got him. But there was no way of knowing. Surrounded by dead infantrymen and burnt-out tanks, he felt he had been left behind in an ash heap of the war. Where the hell was everyone? Cleared out and left him with his finger in the dike? Kraus was a son-of-a-bitch, but that didn't sound like him. Maybe Kraus was kaput too. Hell, I'd get out of here if I knew some way to do it. What the hell am I doing here, anyway? Der Fuhrer said we needed the Russkies' land for lebensraum. The hell with it. I'd be willing to settle for a little less room. When it comes to country as cold and flat and worthless as this — they can have my share. I wonder why these damn Russkies fight so hard for it?

Well, damn them and damn their land. And damn all those bastards living high back there in Berlin. And if Der Fuhrer don't like it, damn him, and his mustache too.

He squeezed off another burst as his eye caught a glimpse of movement among the bodies scattered in front of him on the snow.

Ivan drew in a long breath and held it. It would have to be now. No sense putting it off now. No sense putting it off. That soldier was still alive behind that machine gun, and he wasn't going away. And that last burst had come close. Ivan knew he had lived far beyond what he was entitled to by the odds. He held the grenade tightly in his hand and sprang forward.




Hauptmann Kraus gave another glance around the CP and then followed the last man out. He saw the line of men ahead of him, crawling desperately toward the draw. Some few had already reached it. If there were just some way to get Weizmann out of there now. But as he watched, another wave of infantry was starting toward him from two hundred yards away. Anyone trying to go toward Weizmann's position would be mowed down instantly. And if he didn't get his men up that draw fast none of them would make it back. Still he paused, knowing there was nothing he could do, but feeling something terribly wrong in leaving without Weizmann.

Then as he waited he saw it all happen quickly. The Russian soldier springing forward, Weizmann's gun turning on him to stitch him neatly across the middle, the Russian falling but swinging his arm forward as he did, the grenade black against the leaden sky and falling with precision or maybe just luck in the middle of Weizmann's hole, exploding a fraction of a second later and scattering snow and pieces of Weizmann in a small circle around the hole.

Hauptmann Kraus felt his heart constrict within his chest. Well, he was free to go now. Back to wherever they would tell him the new Eastern Frontier of the Third Reich was being put in for him to defend. He turned and crawled rapidly toward where the line of men was disappearing into the draw.

"Come on, let's go," Staff Officer Steiner said urgently to his friend, who was coming out of the peasant's hut with a last piece of equipment from the CP. They had enough vehicles to carry everyone — but the sound of tankfire had been getting steadily louder. Then, as he looked eastward, he thought he saw some monstrous animal rising from a fold in the ground and swinging its elongated snout toward the group of men clustered around the CP.

He saw the flash and heard the shell approaching at the same moment. He didn't even have time to throw himself to the ground. There was a shattering explosion, a flash of fire, and the corner of the stone house they had been occupying seemed to collapse before his eyes. A shower of objects struck him, and he was sure it was all over. But the shower ceased and he was still standing. Then he saw the objects that had showered him were pieces of stone blown from the house.

"Quick, get those vehicles behind the house!" he shouted. Motors were shoved into gear, wheels spun and then took hold, and those not aboard the vehicles ran clumping on heavy boots around the corner of the building. As he started to run himself, Steiner saw with sinking heart his friend stretched on the snow before the door. Oblivious of the tank, he ran to kneel by his friend's side. He saw a gaping wound pulsing blood from his chest. Desperately he lifted him from the ground, half dragging and half carrying the surprisingly light body, and made for the shelter behind the corner of the house. He expected each moment to hear the rush of a second shell coming in to finish the job. The corner of the house was only a few feet away, then only a step. He breathed a sigh of relief as he slipped past the corner to momentary safety.

For a moment panic seemed to reign. Steiner lay his friend down and spoke with urgent authority.

"Just stay behind the house for a minute. You there, take that Panzerfaust and get over by that corner. The rest of you load up and be ready to get out of here when I give the order. Now don't get excited. There's an eighty-eight only a couple of hundred yards over there. That tank's going to be in his field of fire before he can get to this building. Move fast, now."

Then he could bend down to his friend. The blood was oozing out more slowly now. He couldn't tell how bad it was. His friend was conscious, looking up at him with eyes that seemed as amused as ever. He seemed about to speak.

"Don't talk," Steiner said gently. "We'll be out of here in a minute or two. The aid station's just a little way back there. We'll have you there before you know it."

Hans didn't seem to know what he was saying, but was intent on some message of his own.

"Contraltos. Every damned one." He paused to take a breath. "I saw 'em. Heard their wings flappin'. Not a soprano in the lot."

Steiner felt something pushing up into his throat, making him choke up. He wanted to tell his friend to cut the clowning, this was serious. Then he realized how ridiculous that would sound.

"I saw 'em, but they didn't stop," his friend was muttering. "They went thataway." He rolled his eyes eastward, back toward where the battle had started that morning. "One in front...seen her some place... yeah...jus' like a real bag use' t' sing... Berlin nightclub. Whole gang...built like Tiger tanks."

Steiner blinked back tears and stared helplessly at his friend's face. One corner of his mind heard the eighty-eight speak, the shell rushing through the air, the explosion, followed by other explosions. The shell must have penetrated and set off some of the ammunition. Now they could get out of there.

His friend was still trying to talk. "Ain't worth it, boy. Waitin' 'round f' those ol' bags. Not a good soprano in the lot. Most of 'em off key, too."

Then he seemed to relax, as if he had said all he had to. Then, as Steiner watched, he closed one eye and stared up at him with a roguish wink, child-like but all-knowing.

Steiner stood up and lifted his friend into the back seat of the vehicle. Then he slipped into the front seat and waved the little column on toward the west.

Ivan breathed slowly and steadily. He had his hand pressed tight against the place where the bullets had entered his midsection. He couldn't see the wounds, but he could feel his hand was in the right place. The weight of his body on the hand might stop the bleeding. It might not, too. That didn't matter. He didn't have any business being alive anyway, after all those battles. But he was. And maybe he'd get through this one too.

He felt suddenly faint and dizzy. It was all right. Just try to stay conscious to let the litter bearers know he was still alive when they came by.

He heard a strange buzzing. It seemed like something flying *right over him*. He brushed his left hand in front of his face, like a man brushing off mosquitoes. They shouldn't be bothering him like this. Not in winter. He lay there quietly and concentrated on staying conscious till the litter bearers arrived.

Above him in the fast-clearing sky, the Russian fighter-bombers droned steadily past, heading for their targets in the west.



CREDITS

Game Design & Programming
Gary Grigsby

Game Development
Joel Billings

Customized Disk Operating System
(Apple Version)
Roland Gustafsson

Special Computer Graphics Tools
Keith Brors

Art & Graphic Design
Kathryn Lee, Louis Hsu Saekow,
Dave Boudreau & James C. Sommerville

Typesetting
Abra Type

Printing
A&a Printers and Lithographers

APPLE version: Produced using copyrighted software products of Einstein Corporation.

ATARI version: Produced using copyrighted software products of Monarch Data Systems.

C-64 version: Parts of this product are copyrighted by Drive Technology Ltd. 1983.

If you have any questions or problems regarding the program or game, please send a self-addressed, stamped envelope with your question to: *STRATEGIC SIMULATIONS INC, 883 Stierlin Road, Bldg. A-200, Mountain View, CA 94043-1983.*
Or call our Hotline Number: **(415) 964-1200** every weekday, 9 to 5 (P.S.T.).

UNIT ORDERS MENU

(1-8) Move cursor.

(A)* Advance. This command is only used when the computer is in all-units mode; the formation HQ will move to the cursor location, other units in the formation will move in such a way as to retain their current position relative to the HQ.

(B) Bombard. The cursor location is the target square; the current unit is the spotter; the computer will list the artillery units eligible to bombard the target (see section 5.6).

(C) Center. The map is centered around the cursor.

(D) Disembark. If the current unit is a vehicle then it will unload all of its passengers; if the current unit is a passenger then only that unit will unload; unloaded passengers will have a suppression level of 80.

(E) Embark. Order must be given to a vehicle unit — the computer will request the ID of the unit to be embarked (see section 5.4).

(F)* Change unit facing.

(H) Find unit's HQ. Cursor moves to unit's HQ location; computer determines if a "command control" link exists between the current unit and the HQ; the HQ becomes the new current unit.

(I) Inspect. Allows the player to inspect all enemy units that can be seen by the current unit; allows the current unit to designate a priority target and/or request a bombardment (with the current unit as the spotter). Assigning a priority target with the (I)nspect order will cause a range order to be given if the target is outside of the set maximum range, with the maximum firing range being set equal to the distance to the new target (see section 5.8).

(K)* Cancel all orders. Allows the current unit to cancel all movement and bombardment orders.

(L) Look for unit. Moves the cursor to the current unit's location.

(M)* Move unit. Orders the unit to move to the cursor location (see section 5.5).

(N) Next unit. The next higher numbered unit will become the current unit.

(O) Check movement objectives. Moves the cursor to the movement objective location(s) of the current unit; also lists the command control delay (see section 5.5).

(P) List passengers. Lists all units embarked aboard the current unit.

(Q) Quit the unit orders menu. Return to the map display menu.

(R)* Set maximum firing range at which the current unit will select targets (see section 5.7).

(S)* Set movement speed for the current unit.

(T) Inspect the target that the current unit has selected.

(V) View. The computer will inverse all squares that the current unit can see with its current facing.

(X) Exit the unit orders menu. Return to the map display menu.

(Z) Shift to all-units mode.

* This order may be given to all of the units of a particular formation.

HEADQUARTER SYMBOLS

GERMAN (APPLE & C-64 / ATARI)		SOVIET (APPLE & C-64 / ATARI)	
	German regiment		Soviet corps
	German armored battalion		Soviet tank brigade
	German armored company		Soviet armored battalion
	German infantry battalion		Soviet infantry battalion
	German infantry company		Soviet infantry company

MAP DISPLAY MENU

(1-8) Move cursor.

(0) End game.

(A-U) Select unit. Press formation letter followed by unit index number — computer will shift to UNIT ORDERS MENU; the selected unit will be the "current unit".

(V) View. The computer will inverse all squares that can be seen from the cursor location.

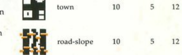
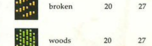
(W) Move cursor to center of objective area.

(X) Exit orders phase.

(Y) Clear units from screen to view terrain.

(Z) Examine friendly or visible enemy units at cursor location.

TERRAIN COSTS

		ARM-VEH	TRUCK	FOOT
	clear	13	13	13
	road	7	3	10
	town	10	5	12
	road-slope	10	5	12
	broken	20	27	17
	woods	20	27	17
	slope	20	27	17
	ford	30	40	20
	bridge	7	3	10



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